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ABSTRACT

The discussion of college and university capital renewal and deferred maintenance (CRDM) explores issues facing campus managers, presents the successful facilities maintenance strategies of eight institutions, and gives an overview of the efforts of several Canadian institutions. An introductory chapter gives background information on CRDM in U.S. colleges and universities and identifies some common characteristics of successful programs. It is found that at institutions with staying power, facilities managers garner support from a variety of senior staff, including the president and trustees, raise awareness of the seriousness of the CRDM backlog, and create positive awareness of achievements through public relations. Subsequent chapters detail the strategic planning and implementation strategies of the University of Connecticut, Rensselaer Polytechnic Institute (New York), the Oregon State System of Higher Education, University of Michigan, University of Miami (Florida), University of Maryland, Louisiana State University, and Jefferson County (Colorado) School District), and address the Canadian situation, looking at such issues as institutional funding history, support from the institution's administration and from state officials, institutional autonomy, the planning process, strategies for eliminating the deferred maintenance backlog, and capital improvement plans. (Contains 56 references.) (MSE)

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SUCCESSFUL FUNDING STRATEGIES FOR FACILITY RENEWAL

Matthew C. Adams, P.E.

HE 031 026

The Association of Higher Education Facilities Officers

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Successful Funding Strategies for Facility Renewal

Matthew C. Adams, P.E.

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ACKNOWLEDGMENTS

These successful funding strategies reflect only a few of the exciting ways in which our colleges and universities are addressing their sometimes staggering levels of capital renewal and deferred maintenance needs. Author Matt Adams has many years of experience as an engineer, management consultant, and expert in facilities financing. APPA greatly appreciates the time, energy, and insight that he brought to this publication.

This book is an outgrowth of the APPA/NACUBO/Sallie Mae report, *A Foundation to Uphold: A Study of Facilities Conditions at U.S. Colleges and Universities*, which was published in late 1996 and based on a 1995 survey of campus conditions. APPA gratefully thanks authors Harvey Kaiser and Jerry Davis for their tremendous work on that study.

Lander Medlin helped structure the content of this book, and Steve Glazner managed the entire project. Peggy Ann Brown, Ph.D., served as primary copyeditor, and Molly Hill Epstein served as contributing editor. Alycia Eck edited and proofread several drafts of the manuscript, designed the cover and interior pages, and coordinated the book's printing.

Finally, we thank all the case study participants who welcomed Matt Adams to their institutions and provided the background he needed to prepare this book. The schools' generosity of information and willingness to share their time is greatly appreciated by the author and publisher.

APPA is pleased and proud to present this collection of CRDM case studies to our colleagues in the educational facilities profession.

INTRODUCTION

Creating the Vision of CRDM Success

When an organization breaks ground for a new building, the event is usually punctuated with high-ranking officials wielding a ceremonial shovel while reporters and photographers hover. When the building opens, the officials use ceremonial scissors to cut the red ribbon and declare the building completed. However, when the facilities management team replaces a chiller, roof, or electrical system, the feat often goes completely unnoticed. The fact is that building maintenance is far less glamorous than building construction. Yet "it is the capacity for maintenance which is the best test for the vigor and stamina of a society. Any society can be galvanized for a while to build something, but the will and the skill to keep things in good repair day-in, day-out, are fairly rare." This quote, from Eric Hoffer's *Working and Thinking on the Waterfront*, summarizes the challenges we face as facilities management professionals. From behind the scenes and with vigor and stamina, we maintain the facilities in which higher education takes place. But as the challenges of maintenance rise, facilities managers have found that they cannot stay behind the scenes and still achieve their objectives.

The demands of aging campus facilities combined with stringent budgets have produced opportunities for facilities managers to create innovative and strategic plans that have piqued the attention of university officials and facilities managers worldwide. This book explores the issues facing facilities managers today, and then presents the facilities management strategies of eight institutions that are triumphing

in this competitive environment. We also include an overview of the efforts of several Canadian universities to address their own capital renewal and deferred maintenance (CRDM) issues.

The average college building in the United States is almost 40 years old, and the average life cycle of the components that make up these buildings is only 23 years. For at least 15 years now the institutional community has raised the battle cry for facility renewal. This effort has largely been based on the traditional methods used by facilities administrators to work within the processes of nonprofit budgeting: the previous year's budget was increased for growth and inflation, or occasionally the budget was reduced. While this simplistic method works with new buildings, as buildings age they require funding that the budget cannot accommodate. Today, facilities managers are forced to maintain aged buildings with outdated and failing systems on an incremental maintenance budget.

The average university's CRDM need is staggering. However, several universities have addressed the critical issues of accumulated deferred maintenance with creative strategies that have allowed them to drastically reduce their CRDM backlog in the competitive budget environment.

All successful facility operations have a vision. Those without a vision continue to struggle as outdated operations. As recently as ten years ago, universities were "shocked" to learn of their CRDM backlog, and responded by paying for a small percentage of the immediate critical deferred maintenance need. However, the shock value of the CRDM backlog has given way to widespread acknowledgment of the issue. Only those that moved past the "shock" stage into an

"institutional policy" phase have succeeded in the facility management litmus test—staying power.

Institutions with staying power are those that adopt many of the same methods and practices used in private, profit-driven organizations. Successful facilities managers garner support from a variety of the institution's senior staff members, including the institution's president and the members of the boards of directors. As they have begun to interact with other university management, facilities management teams have raised awareness of the seriousness of the CRDM backlog, and have increased their importance at the university. Universities now recognize the CRDM issue's serious nature, and, as a result, hold facilities management departments to a higher standard. Facilities management departments are meeting these high standards by creating positive awareness of their achievements through public relations efforts. Facilities management departments then earn the respect of university management through a proven record of success based on sound strategic plans and accountability.

Facilities management departments raised awareness of the CRDM problem by publicizing it. They then ensured that their contribution to the university community was recognized and valued by creating positive public relations. Facilities management organizations that have made concerted efforts to broadcast their goals, actions, and results build positive awareness and create opportunities for continued success. Once university management realizes the seriousness of the CRDM problem and the limited resources available, they cannot help but respect the creative and strategic ways in which facilities management teams address the challenge. The facilities management departments at both the University of California at Berkeley and the University of Michigan

have created positive awareness through public relations. By publicizing their goals, actions, and results these universities have earned the respect and support of university management.

The University of California at Berkeley's facilities management has built support among the university management by involving them in the management of the deferred maintenance effort. Johnny Torrez, physical plant director, and Peter Lin, physical plant associate director, developed the deferred maintenance policy board and invited university leaders to actively manage the deferred maintenance effort at Berkeley. The board includes the chancellor, vice chancellor, three provosts of research, graduate professional schools, and letters and science, the directors of the library, space management and capital programs, as well as one representative of the faculty senate. The Deferred Maintenance Policy Board makes group decisions to distribute insufficient funding to meet the deferred maintenance needs of a decaying campus. The board developed specific parameters of a facility condition assessment, and reviews up-to-date data every six months. By raising awareness of the facilities challenges and involving university management in the decisions, Torrez and Lin have earned the respect and support of the university community.

University of Michigan's Jim Christenson, director of plant operations, recognized the necessity of building awareness of the facilities situation and generating support from the university administration and management, the state legislature, and Michigan residents. To educate the university community and legislature, Christenson created an informative newsletter and followed up with comprehensive presentations detailing the exact nature of the CRDM need. Christenson's newsletter introduces the national CRDM

crisis, details the issues specific to the University of Michigan, and then details the department's needs. Through multimedia presentations to university leaders and state legislators, Christenson publicized the university's CRDM need and answered any questions. His newsletters and presentations raised awareness and played an integral part in persuading the board of regents to approve innovative funding methods.

Each of the institutions presented here as a case study achieved success through a strategic plan that is professional, realistic, and accountable. The strategic plans confront the issue of CRDM backlog directly and serve as constructive evidence to build support for funding. The environment in which a strategic plan is most likely to succeed is one in which university management places a high value on facilities and works closely in conjunction with the facilities management team.

Because the president and board of trustees at Rensselaer Polytechnic Institute value the campus' physical assets, the environment was ripe for a sound strategic plan to eliminate the CRDM backlog and ensure funding. University President Byron Pipes created the long-range strategic plan after Vice President of Administration Tom Yurkewecz assessed the total CRDM need and raised awareness about the critical state of CRDM backlog. As a result, two of the strategic plan's five goals specifically address facilities issues: eliminate structural deficit by 2004, provide a beautiful campus and efficient infrastructure, attract and retain outstanding faculty, create a student-centered learning environment, and provide resources to meet these goals. Empowered by the strategic plan, Rensselaer Polytechnic Institute dedicates $10 million per year to physical plant renewal and has created a

quasi-endowment that will ensure facilities equilibrium and perpetual funding.

Through a combination of luck, publicity, charisma, professionalism, and accountability, these institutions have won support from senior administrators, trustees, and the state systems. However, financial accountability comes along with the support of these university administrators and state legislatures. While educational institutions operated with little accountability—and little funding—in the past, their level of accountability has risen as they gained support and funding. Today, leaders in the industry have transformed themselves into highly efficient, professional organizations that are accountable for their budgets and actions. These institutions may be "nonprofits," but they behave like profitable businesses that continually try to increase profits and minimize expenses: cash flow streams are identified and leveraged; decisions are based on return on investment; the numbers justify all decisions. Because they are accountable for their budgets and plans, institutions have earned a greater degree of autonomy. They have control over their planning, project management and budgets, but must periodically report their progress to both the university and legislature. The approach creates a strong sense of partnership and mutual respect between facilities departments and university management.

The University of Connecticut's innovative university-wide strategic plan, UConn 2000, includes two objectives specific to facilities renewal. First, the plan establishes a special capital improvement program for the university, and, second, the plan authorizes the university to manage its own capital projects. UConn 2000 earned support from the state legislature and the facilities department was

granted $962 million for CRDM over the next ten years. After creating and receiving approval for a priority list, the facilities management team has authority to determine the timing and sequencing of projects, as well as project cost revision and allocations. They have complete autonomy with budget and project management, but the facilities management team submits semi-annual reports to the general assembly. By remaining accountable for their budget and project management, the University of Connecticut facilities management team continues to prove themselves worthy stewards of the university's facilities and the $962 million budget.

Because the CRDM backlog is so high and because facilities continually deteriorate, facilities equilibrium is a process rather than an event. Facilities equilibrium requires a clear vision, as well as a long-term strategy to achieve that vision. Departments that can establish themselves as accountable for their budgets and planning are rewarded with autonomy and continued financial support. The methods through which the universities featured in this book created and achieved that vision vary drastically. But all achieved their success through creativity, determination, and financial common sense. As you read these cases you will notice the ways in which facilities management is rapidly changing, and you may see some strategies that can be implemented in your institution.

UNIVERSITY OF CONNECTICUT

Through UConn 2000, its innovative and structured facility program, the University of Connecticut has secured funding to eliminate all capital renewal and deferred maintenance (CRDM) and provide funding for renovations and repair. With the support of university administration, the facilities management team persuaded the state legislature to provide more than $962 million over the next ten years through a bond issue.

The University of Connecticut, a research institution, was founded in 1881 as a land-grant college. The university comprises the main campus at Storrs, five undergraduate regional campuses, the Health Center, and a School of Law. Storrs is the largest campus with 3,520 acres and 120 major buildings. All campuses total more than 5.2 million square feet, plus 1.8 million feet of residential life space. While the university experienced considerable growth between 1900 and 1920, the average age of the facilities is approximately 40 years.

The University of Connecticut offers a broad spectrum of liberal arts and sciences, professional, and graduate degree programs through its 17 colleges and schools. The university has an undergraduate enrollment of more than 14,600 and a graduate enrollment of more than 7,100.

CRDM Funding History

In the early 1980s the university's facilities management department had internally developed estimates of their financial need, although they were fairly low at approximately

$25 million. When Larry Schilling joined the university as executive director of the facilities department in 1989, he discovered that its financial needs were greater than originally estimated.

Schilling created a strategic plan to ensure facilities funding. Working with Director of Design/Engineering George Kraus and Director of Administrative Services Glen O'Keefe, he set out to accurately estimate the total financial need of the facilities management department and secure funding. First, they created a detailed analysis of the condition of all facilities. Then, they identified their total financial need.

Their plan included enough funding over the next ten years to completely eliminate CRDM backlog and provide facilities funding in perpetuity. They proposed that they raise these funds through a bond issue. After securing university approval for the plan, university administration had to appeal to the Connecticut state legislature for funding.

Support from the University

Schilling and his staff developed a plan that would restructure the way in which facilities assets were managed and ensure ongoing funding. They marketed their plan to university administrators as one that would enable the university to meet their CRDM goal and provide many benefits to the university community.

Knowing that the state had no structured asset management plan for any of its agencies, Schilling positioned his plan as one that could be used as a model for other state institutions and agencies. University administrators enthusiastically supported the plan and gave approval for the first step—a detailed facilities analysis. Eager to accurately identify their total need, the university approved hiring a professional

engineering firm as a consultant. Aided by the consultant's analysis, Shilling, O'Keefe, and Kraus conducted a comprehensive facilities analysis of all seven campuses. They determined their total CRDM to be approximately $300 million.

The university administration was so enthusiastic about Schilling's plan that the University of Connecticut agreed to present it to the state legislature for approval in 1995. Support from the administration allowed the university to present a united front focused solely on the benefit to the state educational system.

Support from the State Legislature

In 1995 the state legislature often experienced conflict between the Republican governor and Democrat-dominated state legislature. However, UConn 2000 was so beneficial to the state, that the legislature agreed to support it. In a time of great dissension and frustration in state politics, UConn 2000 provided a rallying point that created unity between the two parties.

The legislature recognized that all state-owned buildings and facilities were valuable, but realized there was no accurate management plan in place. They recognized the importance of and need for an asset management plan for all state facilities.

The state had a need for an accurate inventory of all state-owned buildings and an assessment of their condition. An inventory would allow the state to ensure that all facilities resources are used efficiently and help the state to maximize its resources by transferring surplus buildings from one state agency to another agency.

UConn 2000 Plan

In preparing their plan, Schilling, O'Keefe, and Kraus worked from the consultant's CRDM report and added to that all their capital needs, equipment, new construction, and renovations. Their total need for the next ten years equaled $1.5 billion, and they developed a plan that clearly outlined their need, their goals, and how such a massive undertaking could be possible.

Infrastructure Program

New Buildings	$ 439,000,000
Deferred Maintenance Projects	246,000,000
Equipment	243,000,000
Renovation and Adaptation Projects	245,000,000
Roads, Parking, and Utilities	71,000,000
TOTAL	$1,244,000,000

UConn 2000's mission is to:

- Improve educational opportunities in Connecticut.
- Establish a special capital improvement program for UConn.
- Enable UConn to borrow money and enter into financial transactions on behalf of the state.
- Authorize UConn to manage its capital projects.
- Assure a state financial commitment to support these activities.

The plan provides the university with enough funding to completely eliminate DM backlog, as well as annual funding to complete all necessary CR. While the university asked for $1.24 billion, they received $962 million. The plan, as approved, provides the university with $962 million over a ten-year period, as detailed below.

Phases I and II

Fiscal years 1996-1999 make up Phase I and will receive a total funding of $382 million. In Phase II, fiscal years 2000-2005, the university will receive $562 million, creating a total of $962 million for Phases I and II. The total project cost of $1.25 billion was reduced to $980 million by the beginning of Phase I, ensuring that by the end of the Phase II CRDM will be approximately $18 million.

University of Connecticut Bond Issue

As proposed, the state will raise the necessary funds by bond issue. Issued under the University of Connecticut name, the bonds are general issue and managed by the state treasurer. At the initial offering of $82 million, demand exceeded $280 million within the first two hours. Because of the unusually strong demand, they were able to offer the bonds at an even lower rate.

The amount of each year's bond issue is established as shown in the chart on the top of page 6.

The university has a clearly defined project approval process. In year one, the facilities management team met with university vice presidents and the chancellor to determine which projects would receive priority for each year's bond issue. In early July, they present the list to the university board for approval. After the board approves the list, they submit it to the governor who has 30 days to approve.

Autonomy to Manage Projects

Once the priority list is approved, the facilities management team has authority to determine the timing and sequencing of projects and project cost revision and allocations. They have the authority to "design, plan, acquire, remodel, alter,

Annual Bond Funding

Fiscal Year	Amount
1996	$112,542,000
1997	112,001,000
1998	93,146,000
1999	64,311,000
2000	130,000,000
2001	100,000,000
2002	100,000,000
2003	100,000,000
2004	100,000,000
2005	50,000,000
TOTAL	962,000,000

repair, enlarge or demolish any real asset or other UConn 2000 project at the university. This authority may be extended to any other capital project already underway at the discretion of the University." However they must report all project revisions, additions, deletions, project cost revisions, and allocations as part of the semi-annual reports to the general assembly. Other than these restrictions, the facilities management team has complete autonomy with budget and project management.

The facilities management team persuaded university administrators that they should manage their own projects because they can do it more cost effectively themselves than if they were to hire project managers from another state agency. Their team philosophy is to keep the organization small. If they cannot manage a project internally, they will hire from the private sector.

The plan creates clear guidelines that ensure fairness and quality control, as well as providing many time-saving elements. The UConn 2000 plan:

- Requires construction standards for all projects and detailed plans and specifications for each project
- Establishes the public bidding processes for construction contracts including bidder prequalification
- Awards construction contracts to the lowest bidder
- Follows all state laws regarding preferences for state workers, wages, hours, etc.
- Expedites the licensing, permitting, and other administrative processes
- Prevents local zoning regulations from barring a UConn 2000 project in an area zoned to allow commercial buildings
- Exempts any UConn 2000 project that involves converting an existing commercial-use building to educational use from an environmental impact evaluation

Project Management

The plan expands the responsibilities of the facilities management team to include:

1. Selecting architects and engineers
2. Selecting a construction administrator, general contractor, and construction managers
3. Managing projects from concept to completion
4. Collecting, analyzing, and reporting data

As Director of Design/Engineering, George Kraus meets with all contractors, architects, and engineers who want to work with UConn 2000. Because of the expanded responsibilities, the facilities management team hired an outside firm to administer some of the projects. The outside firm acts as an extension of the UConn staff.

Additional Funding

While $962 million is an impressive amount of funding, the university's need may exceed that. If so, they have several options to increase funding, including a state-sponsored fund matching program, new project funding, and self-initiated economies of scale.

In addition to the funds raised through the bond issue, the state also has an endowment program that will match all funds earned by the university of more than $20 million. If the university chooses, it could sell its own revenue bonds and then receive matching funds from the state.

To further maximize their funding, the facilities management team has negotiated discounts with their electrical provider, Northeast Utilities. After mentioning that they were investigating the possibility of cogeneration, they negotiated a 14 percent discount off their utilities bill. Northeast Utilities will spend up to $1.5 million to create an energy management system if the university will match it. The utilities company is auditing all university buildings to identify areas for further savings.

Conclusion

The University of Connecticut now has funding that will eliminate all CRDM by 2005 and fund renovations and repairs. They achieved this through their innovative and structured plan, UConn 2000, which serves as a model asset management plan for all other state agencies. In a presentation by university administration, UConn 2000 earned the support of the state legislature and is funded through general issue bonds. The plan gives the University of Connecticut facilities management department complete autonomy to manage both the fund and CRDM projects. As of mid-1997 the University of Connecticut reports that the

first two bond sales were over-subscribed and declared a success. The university is in process of contracting for projects, with over $200 million in construction.

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RENSSELAER POLYTECHNIC INSTITUTE

Rensselaer Polytechnic Institute will have eliminated $42.7 million from their $90 million critical CRDM backlog and has created a plan to eliminate CRDM backlog and achieve facilities equilibrium. The university established an annual facilities budget that includes 2 percent of facilities replacement value and the use of a $10 million allocation.

Rensselaer Polytechnic Institute was founded in 1824 in Troy, New York as a private research institution. It was the first U.S. institution to award degrees in technology. Known for its historic red brick and green-roof campus, Rensselaer has 265 buildings and 3.3 million gross square feet. The average age of university buildings is approximately 45 years.

Like many other colleges, Rensselaer has experienced higher expenses, lower revenues, and increased competition for students. In this competitive environment, it dedicated an increasingly smaller portion of funding to facilities and campus, which caused a CRDM backlog. Today, however, its goal is to "keep up rather than catch up," as it completely eliminates CRDM backlog and ensures an adequate facilities budget.

Tom Yurkewecz has been with Rensselaer since 1973, when he was a housing administrator. In his 24 years at Rensselaer, Yurkewecz has held several campus positions, including plant director. In 1993 he was appointed vice president for administration.

Auditing the Facilities

Although, the exact amount of the CRDM backlog was unclear, Yurkewecz's goal was to determine the amount and eliminate it. The university president recognized the value of the university's physical assets and supported Yurkewecz's plans to audit the facilities. In 1989, Yurkewecz began a plan to assess the university's assets. When he was made plant director in 1990, he called for a full facilities audit, which included the entire campus and the residence system. He identified a $130 million backlog in total CRDM and a $90 million backlog in critical CRDM.

The Rensselaer board of trustees includes five trustee committees, including one entirely dedicated to administration and facilities. As is typical of private institutions, the board places a very high value on physical assets. In addition, the university president also recognized the campus' facility assets and the advantages of eliminating CRDM backlog, and supported Yurkewecz's goals. In 1991, Yurkewecz presented the results of his audit to the board of trustees in a multimedia presentation that included slides illustrating the state of campus decay.

The board of trustees was persuaded by Yurkewecz's presentation and approved a $10 million fund that would provide between $2 million and $4 million per year over a five-year period. They appointed Yurkewecz chair of the Asset Utilization Council, and he began to create a CRDM reduction strategy.

"Charting Rensselaer's Course"

In a brochure titled "Charting Rensselaer's Course," Rensselaer President R. Byron Pipes details the university's current situation, its vision, and the steps the administrators will take to make that vision a reality. This brochure

was originally distributed to alumni returning for Reunion '95.

It explained that in an attempt to maintain its high standing within the economically competitive higher education environment, Rensselaer had under-invested in areas of critical and recurring needs essential to its long-term viability. As a result, it had a $25 million "structural deficit" and had dedicated itself to eliminating it. Wrote President Pipes: "Real deficits result when expenses exceed revenues. Structural deficits result when difficult financial conditions lead to 'eating the seed corn' rather than investing it for the future." To eliminate structural deficit, Rensselaer established a plan that includes five overarching goals.

These five overarching goals, two of which dealt specifically with facilities management, were set in place in 1994. The inclusion of facilities goals illustrates the value the board of trustees places on the facilities, as well as its commitment to maintaining them. Their goals are to eliminate structural deficit by 2004, attract and retain outstanding faculty, create a student-centered learning environment, provide a beautiful campus and efficient infrastructure, and provide resources to meet these goals.

In Rensselaer's commitment to eliminating the structural deficit, it dedicated the greatest part of the budget to physical plant renewal:

- $10 million/year in physical plant renewal
- $7 million/year in quasi-endowment
- $4 million/year in financial aid for students
- $2 million/year in faculty salaries
- $2 million/year in academic program revision

The university's financial commitment to both the physical plant renewal and the quasi-endowment validated their strong commitment to preserving the facilities.

Campus goals provide for a campus physical infrastructure that will enrich and sustain their academic community's learning environment. Among several goals, three subgoals specifically address the facility:

- Invest $10 million/year in deferred maintenance by 2004
- Reduce campus space by 20 percent by 2004
- Develop spaces on campus for greater community interaction

Yurkewecz's CRDM reduction strategy includes physical renewal/demolition, department reengineering, and demand-side energy loans and rebates.

Renovation and Demolition

Since 1991, through fundraising and other efforts, the university will have reduced DM by $21 million through building renewal and renovation. In addition, through allocation of a quasi-endowment and annual budgets, an additional $22 million has been reduced, which totals $43 million.

As part of the national trend toward reduced enrollment, Rensselaer plans to reduce campus space 10 percent by 1999 and 20 percent by 2004. The university selected for demolition buildings that were obsolete and required a greater renewal investment than was financially viable. When the housing repair shop and Rensselaer Housing were demolished, DM backlog was reduced by $8 million.

Reengineering

Rensselaer Polytechnic Institute has experienced enormous success in its reengineering efforts. It employed a new computerized maintenance management system (CMMS) that has allowed it to streamline operations significantly.

Additionally, it has restructured the department management and cut costs significantly.

The university's new CMMS has enabled the facilities management team to automate all work orders and track productivity, including time spent and materials used daily. The daily total is recorded against the work order so they have a running total of time and dollars spent on any specific job. This ensures that projects do not exceed the financial or time budget. The facilities staff currently records its time and materials on a time card that is entered into the system at the day's end, and today many of the facilities staff members record his or her own records electronically.

Restructuring and automating the Campus Maintenance Center has enabled Rensselaer to reduce the routine maintenance backlog by almost a month. It has expanded from providing services during core business hours to working 24 hours a day during the academic year. As a result, it has the reduced maintenance backlog from between 21 and 30 days to less than 48 hours.

Staff or students can contact the Campus Maintenance Center 24 hours a day by either telephone or e-mail. This contact is entered into the center's computer database and assigned to a maintenance crew. The goal is to answer all maintenance requests within 48 hours. If the repair cannot be made within 48 hours, the person who requested the work will be notified of what action the maintenance department is taking to correct the situation and given an estimated date of completion.

In addition to quick response to maintenance issues, the maintenance center will provide immediate emergency response to both personal and building safety issues. Personal safety issues include inoperable door locks and fire

alarm systems, non-securable first floor windows, potential injury items such as broken glass, and lack of heat. Building safety issues include roof leaks causing damage to structure or components, utility breaks, or flooding due to clogged drains or water line breaks. A university staff member or student can report an emergency situation directly to an on-call repair person by dialing "0" after accessing the voice mail system.

Department Restructuring

Rensselaer's restructured departments depend on managers who have a broad range of expertise rather than a single specialty. Each department manages a variety of responsibilities. For example, Auxiliary Support Services includes the usual responsibilities of housing, buildings, and food contracts, but also includes day-to-day maintenance issues. The highly successful Campus Maintenance Center is part of the Auxiliary Support Services group.

The restructured department empowers the facilities management team with a high degree of autonomy in managing renovation and construction projects. The campus planning department employs design staff and architects to supervise all renovations and new construction. If the job is less than $100,000, the department architect will supervise the internal design team. If the project is greater than $100,000, the department will hire an architectural firm to act as on-site project managers.

- Ensure Future Efficiency—Ongoing communication between the supervising architects and the Campus Maintenance Center ensures that all renovations or new construction meet the Rensselaer maintenance standards and will be easily maintainable. It ensures that the materials used and the systems chosen for the buildings

will be efficient and consistent with current university standards.

- Ensure Budgeting—While managing a renovation or construction project, the facilities department acts as a cost center. It manages any expenses related specifically to the institution, such as furnishings, telecommunication, cabling, and asbestos abatement. By managing all elements that must interact with a university-wide system or serve a function specific to the university, the facilities management team ensures that all systems are compatible and effective. In some cases, other expenses, such as architectural fees, engineering, and construction management, are managed by the contractor. This enables the facilities department to control costs while ensuring future efficiency.

In addition to funding from the university, Rensselaer also receives guaranteed low-interest loans from New York State Public Utilities for renovations. Rather than use funds from the quasi-endowment for energy-related improvements, the university uses short-term loans available from the utility provider. It pays the loans back within three to five years and earns a greater return on investment than in interest it pays.

Now that Rensselaer has taken advantage of the short-term return on investment projects such as more efficient energy-generating systems, it focusing on longer term projects. These include more energy efficient windows, doors, and building shells.

Conclusion

With the support of the Rensselaer Polytechnic Institute president and board of trustees, Vice President for Administration Tom Yurkewecz has found a way to "keep up rather than catch up" with CRDM. After a detailed audit discovered

$130 million in CRDM backlog, $90 million of which was critical, Rensselaer developed a plan to eliminate backlog and establish facility equilibrium.

Toward this end, they have set clear goals that include both renovation and demolition of existing structures and reengineering and restructuring the facilities department. Rensselaer has increased project management autonomy and efficiency, and increased department productivity and efficiency. Through this plan, it has already eliminated more than a third of its critical CRDM backlog. With the funding for 2 percent of the facility's replacement value and the $10 million quasi-endowment, it has been successful at addressing its CRDM backlog to achieve equilibrium.

OREGON STATE SYSTEM OF HIGHER EDUCATION

Through the efforts of the Oregon State System of Higher Education (OSSHE) management team, CRDM funding has increased 500 percent since 1989, from $4.8 million to $24 million. OSSHE presented the facts of CRDM backlog and positioned the CRDM funding as a way to protect the state's investment in campus facilities. The legislature responded by increasing funding through the general fund and a bond issue. As a result, while other state-funded organizations and other OSSHE programs have experienced budget cuts, OSSHE has increased its budget.

The Oregon State System of Higher Education (OSSHE) system includes seven universities and colleges, including Oregon State University (OSU). OSSHE selected OSU for its pilot program to assess and eliminate CRDM. Oregon State University was founded in 1885 as a land-grant college in Corvallis, Oregon. It is a public, four-year, comprehensive research university with almost 14,000 students. It is Oregon's land, sea, and space grant institution. Oregon State University owns and leases more than 39,000 acres of land, including experimental farms and forest. The main campus includes 420 acres. The Oregon State University campus boasts 265 buildings with more than 3.3 million square feet of space. The average age of facilities on the Oregon State University campus is approximately 44 years, and for the OSSHE system the age is approximately 45 years. However, the university has more than 20 building projects scheduled for completion before the year 2001.

Prior to 1989, CRDM funding to OSSHE had been very limited. There was no formal CRDM plan in effect and many of the universities within the system had decayed significantly. The state legislature had no knowledge of the university's physical state and took no action to halt its decay. George Pernsteiner raised awareness of the system-wide facilities funding problem and selected Oregon State University as the pilot institution for his CRDM plan.

Assessing the CRDM Need

When George Pernsteiner joined OSSHE in 1989 as vice chancellor of facilities, he quickly realized that the university system had no accurate way to assess the condition of its facilities. Therefore, it had no accurate way to estimate its CRDM backlog or future maintenance expenses. Pernsteiner petitioned the state legislature for facilities funding and received $7.3 million. However, he realized that without detailed information to accurately estimate the system's facilities need, he had no evidence with which to persuade the legislature to increase funding.

At the same time that Pernsteiner was contemplating how to determine the facilities status, university management decided that the facilities at Oregon State were woefully in need of repair. Ed Coate, OSU's then vice president, was concerned that if it didn't do something to improve the facilities soon, the university would lose the value of its assets, and many would no longer be functional.

Pernsteiner and OSU management joined forces and performed a "building reconnaissance" to assess the condition of all university buildings. Their goal was to accurately identify the CRDM backlog and gather evidence to persuade the state legislature to increase funding. However, their initial efforts revealed that there was a larger problem of

deteriorating buildings and growing CRDM system-wide. They needed an auditing system that would establish the total CRDM need. They determined that Oregon State University would be the pilot for the rest of the system, and OSU and OSSHE jointly funded a facilities audit by an independent contractor.

The goal of the audit was two-fold. First, they wanted an assessment of the OSU facilities condition that they could use to estimate and prioritize CRDM projects. Second, they wanted an auditing methodology and format that they could duplicate system-wide. Other universities and colleges within the OSSHE system who couldn't afford to hire an independent contractor could replicate the study using their own internal physical plant staff.

The successful end result was that they determined an OSSHE deferred maintenance backlog of approximately $135 million, and a total backlog in all colleges of $435 million. Pernsteiner and Coate took this figure to the OSSHE board and the Oregon state legislature as evidence of their need.

While Pernsteiner and Coate were completing their study, the State of Oregon passed Measure 5, a law that reduced available funds drastically. Measure 5 greatly reduced property taxes for Oregon residents, and thus limited the amount of funding available to all state institutions.

Persuading the State Legislature

Oregon State University's success with the state legislature can be attributed to the university administrators' strong support. Forceful presentations by Vice Chancellor Pernsteiner and the research conducted by Pernsteiner and university Assistant Vice President Kathleen Mulligan gave them the ammunition they needed to persuade the university

president and chancellor of both their situation and their financial need. With the support of the university president, Pernsteiner and Coate won support from the OSSHE board. The OSSHE board made deferred maintenance its top construction priority for 1991—and has continued that priority ever since.

In Oregon, the budget is divided into two parts, the operating budget and the capital budget. Separate hearings for each budget ensure that the capital budget will not be ignored or overlooked. In 1989 Pernsteiner and Coate defined deferred maintenance as a capital construction item, this tack had both advantages and disadvantages. As a capital construction expense, deferred maintenance has the advantage of being differentiated from the myriad of expenses in the general appropriation. However, by classifying deferred maintenance as a capital construction expense, they risked losing the automatic renewal of the operating budget.

Ultimately, the classification of deferred maintenance as a capital construction expense allowed OSSHE to have a hearing separate from the rest of the budget. The separate hearing created high visibility for the CRDM backlog problem and led to the creation of a special subcommittee within the state legislature's Ways and Means Committee in 1991.

Pernsteiner's 20 years' experience as an administrative director for a major city paid off as he prepared his presentation. He included a film that showed the extent of the deferred maintenance problem on all campuses within the OSSHE system. After presenting the numbers, Pernsteiner appealed to the board to make CRDM their top priority. He pointed out that their physical assets were deteriorating and enrollment was declining. Finally, he asked for consistent annual increases in funding. He earned the support of

the committee and successfully petitioned the legislature for funding. While the increase in funding was modest, it was a positive beginning and a valuable stepping stone.

Funding

Despite the limited funds, Pernsteiner used the results of the study to persuade the OSSHE Board and Oregon State legislature to increase funding to the general fund cash and authorize a bond issue, thereby generating about $24 million per biennium, rather than the former $4.8 appropriation. In the hostile funding environment of Measure 5, OSSHE was the only organization to receive an increase in funding for facilities repair.

- General Fund Cash Funding—The general fund, generated by state taxes, is allocated by formula to each university. Despite the drastic budget cuts caused by Measure 5, the Genera l Fund appropriation for capital repair and deferred maintenance has continued to increase each biennium even though the overall appropriation level for OSSHE was slashed by more than $50 million.
- Bond Issue—The state legislature authorized a bond issue through the state treasurer. The chancellor's office pays the debt service in an amount equal to the general fund cash fund. The debt service is covered by a special appropriation from the legislature. OSSHE allocates bond monies to member institutions based on need. The bond issue enables OSSHE to leverage cash flow and ensure that each university or college receives equitable funding each year. In the 1995-97 biennium, OSSHE raised more than $11 million through the bond issue.

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- Capital Campaigns—All members of the OSSHE have development offices whose goal is to raise funds specifically for renovation projects. The state will match funds raised in capital campaigns, and OSU is currently completing a $20 million capital campaign which the state will match with another $20 million. This $40 million will expand the central library and renovate the current library. Fundraising also has spurred the renovation of two older classroom buildings on the OSU campus and has provided the funding for an upcoming remodel of a classroom facility at the University of Oregon.
- Other Sources—OSSHE also has other sources of funding available. Universities benefit from gift monies and diverted grant monies, and have developed several creative ways to generate funds. For example, Portland State University acquires major buildings in downtown Portland that they partially occupy and partially lease to public or private tenants, and the rent pays for the university's occupancy and maintenance of the building as well as debt service on the bonds used to acquire it.

Additionally, the university has access to emergency funds. Several years ago, OSSHE appealed to the emergency fund for deferred maintenance and asbestos removal projects, and it was granted almost $4 million.

Continued Funding through Continued Leadership

After the successful 1991 legislative session, the facilities management team determined that it would establish itself as a strong leader and trustworthy steward of the OSSHE campuses. It created a strong presence in the legislature by participating in legislative sessions and providing annual progress reports. Kathleen Mulligan recently provided a six-year retrospective of OSU's progress to a very supportive legislative committee.

In the 1993 legislative session, the facilities management team became a leader in campus renewal by providing an update on each of the campuses. It reported its progress on the mission with which it had been charged—to halt the deterioration of physical assets. It specified which improvements were made on each campus and the results of each. However, it also pointed out that while it had made the specified improvements, the campuses continued to deteriorate. It pointed out that without increased funding, the deterioration would exceed the renewal.

During one of Pernsteiner's presentations, a committee member realized the extent of the problem and pledged his support to the funding effort. The committee member invited Pernsteiner to an open legislative session where the member built support for the renewal effort. Pernsteiner participated in 26 hearings and recommended that the legislature amend the statutes to allow for a bond issue. The committee and the legislature agreed, effectively doubling the funding for CRDM.

Facilities Management Autonomy

As a result of Pernsteiner's efforts, each university's facilities management team has extensive autonomy with its budget and project management. The facilities management teams also control planning for new facilities. They have the autonomy to manage all aspects of a project, whether it is new construction or renovations.

The facilities management team hires architects and provides input on the architectural plans. It then determines specifications for the building components and materials and selects contractors. Once the facilities management team receives the design, development, and construction documents, it holds a formal review process in which

facilities personnel evaluate how effectively they will be able to maintain the proposed building. In this portion of the process, OSU can prevent maintenance problems and ensure that all new construction and renovations meet its criteria. Once the construction begins, OSU inspects construction of the building for adherence to its standards, as well as adherence to subsequent operations and maintenance.

In an effort to increase the efficiency of each university and allow greater autonomy, the Oregon state legislature passed the Higher Education Efficiency Act (HEEA) in 1995. The ultimate result is that the facilities management team of each university within OSSHE has almost total autonomy and decision-making authority.

- Financial Control—Before the HEEA, the facilities management team required legislative approval for all construction contracts greater than $100,000. Approval must be sought now only for projects of $500,000 or more.
- Contracting Methods—Before HEEA, all contracting methods were prescribed by law. However, the HEEA allows a high degree of flexibility in choosing the method. Each campus chooses its procedure for acquiring the most competitive price or the contractor with the best relevant experience, as well as the most efficient way to manage contractors.

The HEEA created significant legal changes that enable the university to operate more efficiently, effectively, and economically. The OSU facilities management team was able to eliminate complicated procedures and costly overhead.

Conclusion

OSSHE is only state organization that consistently increased its facilities repair budgets since Measure 5 decreased the amount of funding available. George Pernsteiner quantified OSSHE's CRDM need and then persuaded the Oregon state legislature to increase funding. While the entire OSSHE system has benefited from their efforts, Oregon State University has served as the pilot and illustrates the program's success to state agencies.

OSU now has a CRDM budget of approximately $15 million, increased from $2.4 million in 1989. The OSU facilities management team plans to continue making presentations to the legislature to quantify its accomplishments and highlight the continually growing CRDM need. It also plans to continue to request increased CRDM funding. The CRDM funding effort is a top priority for all legislatures, and the future for all campuses in the OSSHE system looks bright. While they have not yet established equilibrium, they have creatively worked with the state legislature to produce significant CRDM improvements in an economically challenging environment.

UNIVERSITY OF MICHIGAN

By raising awareness among university administrators and regents, the University of Michigan has created a plan that will entirely eliminate CRDM backlog and achieve financial equilibrium by the year 2002. Despite elimination of state-funded CRDM monies, it has reduced the CRDM backlog from $85 million to $51 million by educating the university administration and regents through presentations and publications. Once the university reaches equilibrium in 2002, plant operations will require only $20 million per year to maintain one of the nation's largest campuses and most extensive facilities departments.

Originally chartered in 1817, the University of Michigan moved to its present location in Ann Arbor in 1937. Today, it is one of the largest university facilities, with 182 university-owned buildings and 25 million square feet of space on four campuses. The extensive general fund facilities alone include 3.3 million square feet of roof, 268 elevators, 2,000 fume hoods, 65 steam absorption chillers, and 130 cooling towers.

The University of Michigan has an enrollment of more than 36,600 and is a public research university. However, the State of Michigan provides only a fraction of the university's revenues. The university has created a facilities department that is funded through state support, research, and tuition. Its annual budget totals more than $100 million.

Through a concentrated effort to eliminate all deferred maintenance with a combination of cash and borrowed funds, the university will reach equilibrium by 2002. The

funds it brings in each year will cover all maintenance costs and eliminate the need to defer projects of any kind. Jim Christenson, director of plant operations, achieved this equilibrium with strong planning and by creating support from the university community through publications and presentations.

In addition to having one of the largest campuses, the University of Michigan also has one of the largest facilities departments: it has more than 1,100 people on the plant services payroll. In addition to the usual departments of building services, grounds and waste management services, maintenance services, and utilities, the University of Michigan plant operations also provides:

- Transportation Services—Leases or rents more than 850 vehicles and maintains 1,000 vehicles. Provides low-cost transportation to nearly 4 million people each year.
- Parking Services—Develops, maintains, and operates more than 22,500 spaces.
- Plant Business Manager—Supports mainframe computer, keeps records for 1,100 people, manages $140 million in transactions for the Plant Operations Division.
- Personnel Officer—Manages personnel and training staff. Guides in-house apprenticeship program.

CRDM Funding History

When Jim Christenson joined the University of Michigan in 1991 as director of plant operations, state funding of the university CRDM was very sporadic. While it had a financial plan in place, the state provided funding only three of eight years, and once recalled the money after it was distributed. While it is still a public university, the University of Michigan is a very financially independent organization. The State of

Michigan provides only a fraction of the funding that the university needs to survive: last year the state provided only $400 million of the university's $2.5 billion budget. The university raises the majority of this budget through grants, tuition, and research. The university determines the division of the $2.5 billion budget based on a mutually agreed-upon formula.

Christenson's and the University of Michigan plant operations' goal is to make the university's physical environment function successfully and economically to support the learning activities. Christenson summarizes his attitudes toward maintenance with a quote from Eric Hoffer's book *Working and Thinking on the Waterfront*. [New York: Harper & Row, 1969.]

> It is the capacity for maintenance with is the best test for the vigor and stamina of a society. Any society can be galvanized for a while to build something, but the will and the skill to keep things in good repair day-in, day-out, are fairly rare.

With limited state funding and a $51 million CRDM backlog, Christenson and his colleagues at the University of Michigan are finding creative ways to eliminate CRDM backlog and create equilibrium by the year 2002.

Christenson has allies in the University of Michigan's capital planning department. William Dergis, director of plant extension, is interested in eliminating CRDM backlog and creating a healthy CRDM budget. While his role in capital planning is to plan and oversee all new construction, Dergis recognizes the need to fund maintenance and renewal on existing facilities. Dergis has long been a proponent and leader of CRDM funding: in 1981 Dergis and Douglas Sherman, then assistant vice president and director of capital planning, co-authored an article in NACUBO's

Business Officer titled "Funding Model for Building Renewal." They wrote that "it is essential that funds for building renewal begin to flow quickly and in substantial amounts."

Creating Support from the University Community

Christenson recognized the importance of building awareness of the facilities situation and generating support from the university administration and management. His first step was to educate the university community, which he did through a newsletter and presentations.

In the May 1992 *Michigan Issues*, the university's government relations newsletter, focused entirely on the facilities situation. In the newsletter, subtitled Renovation and Repair: Foundation for Michigan's Future, Christenson clearly and concisely introduces the national CRDM crisis and some basic terminology. He details the issues specific to the University of Michigan and provides examples. Finally, he explains the facilities department's needs.

This publication educated the university community, alumni, Michigan residents, and the legislature. It serves as a reference for the public, and a resource for the university community. The university president calls this newsletter "one of the best explanations of the problem of deferred maintenance," and distributes it to state legislators who call with questions about the campus.

Christenson also created support from the university community through multimedia presentations. He educated his audience by detailing the situation, explained the university's facilities needs, and then asking for funding. The presentations were an integral part of convincing the board of regents to approve innovative funding methods.

A "Privately Funded" Public University

To meet their financial needs, the University of Michigan plant operations has turned to some methods of funding ordinary used by privately funded universities, such as bonds, special project funding, and student fees. Through a combination of these fund-raising efforts, the university has eliminated $32 million from deferred maintenance and completed extensive capital renewal projects.

When the state cut funding to the university, estimated total DM was $85 million. Recognizing the importance of minimizing DM, Christenson appealed to the board of regents for special DM funding. He prepared an organized and sensible presentation to the regents that was successful in creating the plan for equilibrium.

Christenson began by educating the board about the condition of and importance of the facilities. He also set realistic expectations for cost of maintaining a facility once it is renovated: he explained that for a facility to be perfectly maintained would require 1 percent of its replacement value per year in renewal funds. He asked for enough funding to completely eliminate all deferred maintenance, plus annual renewal funding equal to 2 percent of the facilities' value, recognizing the significant help being provided by major renovation projects.

While not immediately providing any money for DM, the board of regents and university administrators approved a bond issue for capital renewal and a special student fee specifically for deferred maintenance.

Student Fees Fund Deferred Maintenance

As was expected, students disliked the idea of a new fee to fund deferred maintenance, as it represented a large portion

of their tuition. To make it more palatable, the university dedicates a portion of the fee to financial-need scholarships and educates students about its importance through public relations efforts. The facilities department uses independent publications and special interest articles in the student newspaper to discuss how the fees renew the campus and provide scholarships.

The student fee began at $50 per semester and was gradually increased. Currently, the fee is $185 per semester for more than 36,000 students, totaling approximately $14 million per year. Last year, $2.5 million funded scholarships and $2 million was used to repay the bond issue; the remaining $9.5 million was used for renewal and major renovation.

Additional Funding Sources

In addition to the student fee, the regents also approved several other forms of CRDM funding, including a capital renewal bond, special project funding, and grants. The university raised money for renovation through a $100 million bond issue. The goal of this bond was to renew and renovate a majority of the buildings at one time, thus eliminating a majority of the deferred maintenance.

The board of regents oversees allocation of state funds. Regents are elected to serve specific universities within the State University System and act as a board of directors. Facilities managers can appeal to the board of regents with special requests for funding.

While the state does not take responsibility for funding the university, it occasionally will make special appropriations to the university for CRDM. In an effort to stimulate the economy by creating construction jobs, the governor

gave the university a $80 million grant to build a new technology center and renovate other buildings.

Eliminating Deferred Maintenance Backlog

When the University of Michigan renovates a building, it eliminates the deferred maintenance backlog by including most of the needed repairs in the renovation process. For example, during renovation the university usually replaces the HVAC system and often replaces the plumbing. By eliminating older, higher-maintenance systems and replacing them with new efficient systems that meet the university's maintenance standards, it reduces both DM and maintenance while ensuring that it will be able to maintain the new system within the projected budget.

Creating Equilibrium

If funding continues at its present level, the University of Michigan will entirely eliminate the CRDM backlog and achieve equilibrium by the year 2002. Once the university achieves equilibrium, the goal of plant operations is to have an annual budget that equals the annual expenses for capital renewal and repairs. Christenson used a format that helped the regents understand the scope of the university's maintenance responsibilities by detailing their annual expenses.

In the future, the University of Michigan will move to resource center costing and bill utilities to each school and college (responsibility centers). Utilities payments by the individual responsibility center will help eliminate the gap between funding and need, enabling the university to further invest in cost-saving measures and continue the self-perpetuating cycle of saving and reinvestment in more efficient facilities. This ensures that the University of Michigan will continue to experience financial equilibrium.

Annual Repair and Capital Renewal Expenses

Project	Cost*
Replace four acres of roofs	$800,000
Replace eight elevators	3,200,000
Replace three chillers	2,400,000
Replace five cooling towers	300,000
Replace air handlers, other HVAC	2,000,000
Repair 200,000 SF of exterior walls	500,000
Replace windows	1,500,000
Replace piping systems	5,000,000
Replace 60 fume hoods	1,300,000
Replace electrical systems	1,000,000
Other	2,200,000
TOTAL	$20,000,000

Conclusion

The University of Michigan eliminated $34 million in CRDM backlog through innovative funding that includes a special student fee that raises almost $14 million per year. Through a strong public relations effort, the facilities department has earned the support of the university community.

Through strong planning and budgeting, the University of Michigan will eliminate all deferred maintenance and achieve equilibrium by 2002. With an annual budget of $20 million in 1996 dollars, the university will continue to exist in equilibrium. While this is a monumental task for any university, the University of Michigan has achieved this despite limited state funding and extensive facilities.

UNIVERSITY OF MIAMI

Since 1989, the University of Miami has reduced its CRDM backlog from $58 million to $34 million through its innovative Facilities Asset Management Program. The facilities department has wide latitude to effect operational savings and then reinvest this savings in facilities renewal projects.

The University of Miami was chartered in 1925 and constructed its first building in 1926. Since then, the university has grown to four campuses and 149 university-owned buildings, totaling approximately 4.6 million square feet on more than 400 acres of land.

- Coral Gables—The Coral Gables campus is located on a 260-acre tract in suburban Coral Gables. It has 101 buildings occupying 3.7 million square feet.
- Medical Campus—The university's medical campus consists of 12.5 acres within the 67-acre University of Miami/Jackson Memorial Medical Center complex. Its 22 buildings cover 1.3 million square feet.
- Rosenstiel School Campus—This Marine and Atmospheric Science campus is located on a 16-acre waterfront site on Virginia Key in Biscayne Bay. Its 16 buildings total 270,400 square feet.
- South Campus—The South Campus, located ten miles southwest of Coral Gables, opened in 1985 on a 106-acre site. Its five buildings provide 48,600 square feet for research and development.

The University of Miami has an enrollment of approximately 12,700 students and is a private research university. While it is known for its high academic standards and

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beautiful campus, the university is establishing itself as a facilities management leader. Through an innovative plan in which the facilities department manages its own budget and reinvests its savings, the University of Miami has created greater efficiency and significantly reduced CRDM backlog. This case will deal primarily with the Coral Gables campus.

Background

When Vic Atherton was appointed assistant vice president for facilities administration in 1989, the department was loosely organized and suffered from widespread inefficiencies. Facilities conditions were poor; most buildings needed painting, roof replacement, and interior upgrades. Air conditioning systems were near the end of their useful lives, and deferred maintenance projects were done on an emergency basis. The estimate of the deferred maintenance backlog was in excess of $58 million, and there was inadequate funding identified for projects.

Atherton hired consultants to assess needs, and after realizing the complexity of the situation, considered outsourcing the entire department. While it was evident that significant savings were possible by contracting, he eventually rejected the outside proposals. Instead he made an offer to the university administration that proved to be a win-win arrangement for both the facilities department and the institution as a whole.

Realizing that contractors' profits and fees would greatly erode the savings benefit associated with outsourcing, Atherton approached the administration with a proposal that called for freezing the existing facilities budget. The only increases for O&M would be the annual cost of living raises granted to other university employees, any utility rate

increases, and incremental funding for new facilities. In essence, his budget would remain "flat" in 1989 dollars. In return, he proposed wide latitude by his department to generate savings from operations, and all savings would be reinvested into deferred maintenance projects. This plan was presented to the senior vice president, the provost, and the president of the university. After discussions, Atherton was granted approval to proceed, and to reinvest the savings as proposed for the next five years.

He immediately set out to cut costs by renegotiating existing contracts and eliminating unnecessary positions. Of significance was the rebidding of the environmental services contract (custodial and grounds) and the elimination of 13 positions that were dedicated to a small in-house renovation crew.

He also began the task of assembling a new administrative team. Director of Physical Plant Mike White was hired to assist in the development of cost reduction programs and to direct operations. Together, Atherton and White began the development of a comprehensive plan to cut costs, improve service, and upgrade facilities.

Creating the Savings

Atherton, who was heavily involved in the university's construction projects during this time, engaged engineers and consultants to help identify energy projects that promised return on investment. Among these was retrofitting the old worn-out, and inefficient chillers that supplied the university's air conditioning. Plans were developed to replace this equipment with new, high-efficiency chillers, and a new chilled-water loop was designed. To finance these projects, Atherton borrowed internal university money and aggressively pursued energy grants and utility company rebates.

The projects were approved by the university's board of trustees. Once completed, a new chilled-water loop, with 4,000 tons of high-efficiency chillers replaced the old equipment. Load controls were placed on chillers that allowed for lower utility rates. Electrical consumption dropped quickly, loans were paid off, and the savings were available for additional projects.

A major relighting program was implemented, and energy projects of many types were accomplished. Over a six-year period, electrical consumption was reduced by 37 percent when measured on a *per square foot* basis; dollars *per square foot* were down 40 percent, using 1989 as a base year.

With an energy conservation plan well underway, Atherton and White began to more fully develop other aspects of their cost reduction programs. Because they were working with a flat budget, every increase in efficiency meant more money to devote to new projects. Therefore, the more efficient they made operations, the more funding available to accomplish projects. It was a driving incentive.

In addition to environmental services, other areas were identified as possible targets for outsourcing. As attrition occurred in shop areas, White brought in contractors to perform painting, carpentry, plumbing, and other skilled functions. Shop supervisors found themselves managing service vendors in ever-increasing numbers. For larger projects, the university established a competitive rate scale by securing bids from local companies, and then issued work to pre-qualified contractors at those rates. In this fashion, the university works with many contractors and does not risk overloading one firm. Outsourcing of pest control, fire safety, architectural and engineering services all contributed to additional savings

Performance levels were increased for both in-house personnel and contractors, with both groups held to the same high standards. By 1996, 70 percent of every maintenance dollar was going to outside providers.

The Facilities Asset Management Plan

While Atherton attended to construction and energy projects, White focused on the development of their Facilities Asset Management Plan. This plan is a formal approach to facilities assessment, facilities renewal, and facilities maintenance. It calls for knowing the exact conditions of facilities, bringing them up to high standards, and keeping them in a good condition. A brief description of its three parts follows.

The Facilities Conditions Report (FCR) is a living database of facilities conditions. It is updated annually by in-house personnel and is used to prioritize all CRDM projects. It is presented to the Facilities Planning and Construction Department before any renovation project is to be accomplished. This ensures that all existing conditions are known in advance and encourages departments that fund renovations to correct deferred maintenance conditions as part of the project. It also allows Facilities to prioritize renewal projects to accommodate windows of opportunity.

The Renewal Plan is a five-year picture of upcoming CRDM projects to be funded by Facilities. It is entirely based on the FCR and is structured to address waterproofing and HVAC systems as first and second priorities. Service systems, classrooms, rest rooms, and public areas follow in priority ranking.

The Facilities Maintenance Program (FMP) is a set of highly defined maintenance schedules that have been developed specifically for each building. These are computer

scheduled and allow a high degree of control and standardization over the maintenance function.

Creating Support from the University Community

Atherton and White generated support from the academic divisions by working closely with deans as they developed renewal projects. As facilities conditions improve, they find better acceptance of their programs. All projects are coordinated with the respective deans and input is solicited from them during the planning process.

They also work with the academic divisions as deans prepare strategic plans for their schools. Each division is given its detailed facilities assessment, a list of past accomplishments, and they are presented with the agreed-upon plans for the next five-year period. This "meeting of the minds" promotes better channels of communication between Facilities and the academic divisions, and allows coordination of planning between the two groups.

Process Reengineering

The University of Miami places a heavy emphasis on *process improvements*. A director for continuous improvement reports to the senior vice president for business and finance. Extensive training has been provided to department managers across the university, and Facilities Administration has been a strong leader in the development of continuous improvement processes.

Over time, customer service has become the focus of facilities operations. Response time is monitored to ensure that service is rendered in a timely manner. Customer comment cards are now issued for every work order performed, and a system has been created to review the cost of billable work before the charges go out.

Existing functions are continuously analyzed for efficiency. As an example, Alan Weber, associate director for contract administration, reengineered the waste removal process by using a central compacting facility. Only fully loaded compactors are now picked up by the waste removal contractor. The cost savings from this process improvement amounted to $350,000.

A vehicle reduction program was recently implemented that reduced the fleet of vehicles by 12 trucks. A new work order management system has been installed that provides monthly performance measures to gauge the departments effectiveness in meeting customers' expectations.

Reorganization

As the Facilities department sought to increase efficiencies, it became apparent that the typical *craft shop* approach to maintenance was inefficient. Supervisors were spending too much time "chasing resources," and it was often unclear regarding who actually *owned* the facilities.

A formal labor study performed by the Department of Industrial Engineering revealed a wide array of inefficiencies within the existing structure. After months of study, White decided to abandon the craft shop approach and to establish a strong maintenance zone concept.

Four facilities zones were established, each with a manager in charge. All personnel from the shops were reassigned to one of the new zones, with the exception of the chiller plant personnel. In this process, no less that eight supervisory positions were eliminated, and the organization was significantly flattened.

Motivating Managers through Autonomy

Just as the university administration gave Atherton control of his resources, facilities managers were given control over their budgets as well. With general guidance from White, managers now control their own budgets and can use savings to purchase additional resources or fund projects in their areas.

The university's arboretum landscape renovation demonstrates the effectiveness of this plan. Alan Weber, for example, used his savings to purchase rare and beautiful trees that are now the pride of the campus. Other managers have performed equally beneficial projects to their respective areas.

Interfacing Construction

Atherton realized the significance of a strong relationship between Physical Plant and Facilities Planning and Construction. Accordingly, he instructed the executive director of facilities planning and construction to recognize the Physical Plant Department as their number one customer. Since Physical Plant will eventually maintain all buildings, it has a vested interest in all aspects of the construction process. As a result, during the planning phase for new projects, facilities managers now review construction documents to ensure good design and standards.

Recently, the first volume of a *Component Standards Manual* was completed that specifies what components and products work best for specific applications. This document has been transmitted to architects and now ensures that the Physical Plant's collective knowledge will benefit future projects.

The Future

While there is still work to be done, the University of Miami facilities department is proud of its accomplishments, and has received positive recognition from the university community. As a result of operational improvements undertaken by Physical Plant, the quality and appearance of the campus buildings and grounds have improved significantly. The campus is now a source of pride to the university community, creating an enhanced physical environment for the recruitment and retention of students.

UNIVERSITY OF MARYLAND

The University of Maryland has funded CRDM by reducing overhead costs, maximizing opportunities for supply-side energy savings, demand-side energy rebates, and low-interest energy loans. It has created a self-perpetuating savings cycle in which it invests its savings in energy-efficient facilities. Because of its success in projects such as this and its qualified staff, the state asked the University of Maryland in College Park to develop a system-wide facilities audit process. It is developing an audit process that collects consistent, detailed data on all of the state's 11 universities. This facilities audit process will be used to assess the system's total needs and allocate funds equitably.

The University of Maryland in College Park was founded in 1856 as a land-grant college, on more than 1,378 acres. It is the largest and oldest university in the Maryland state university system. Its 350 university-owned buildings total more than 10 million square feet. While the campus includes historic buildings from the university's early years, the average building is 34 years old. The university has an enrollment of more than 35,000 students and is a public, comprehensive research institution.

The state identified the University of Maryland as a leader in facilities efficiency and management and asked it to lead the development of a system-wide facilities audit process. Administrators are creating a facilities audit process that will allow the university system to allocate funds accurately among its 11 schools and to create greater efficiency.

CRDM Funding History

Until recently, the University of Maryland's funding has come directly from the board of regents through the state. While it estimated its CRDM backlog to be up to $100 million, the university did not pursue a detailed audit because it doubted the state's willingness to fund such a program. Historically, the state provided between $2 million and $5 million annually for CRDM.

The board of regents allocated its budget to schools within the university system based on their square footage. Because the University of Maryland represents 45 percent of the total square footage, it was allocated 45 percent of the $15 million in 1995, or $6.75 million. The board of regents would like to increase its budget from $15 million to $25 million, which would mean the University of Maryland would receive $11.25 million. However, the university analyzes its need at between $20 million to 25 million. It could reach this budget and achieve equilibrium if it receives the $11.25 million from the board of regents and add it to its creative ways of funding CRDM.

Frank Brewer joined the University of Maryland as director of the facilities department after working in residential life. Brewer's background and his current position creates a symbiotic relationship between facilities and residential life, eliminating any of the confrontation that is typically experienced at other institutions. Jim Piper acts as the department manager and is responsible for developing the auditing system that will be used system-wide.

Creative Ways of Funding CRDM

Rather than allow its campus to deteriorate or the CRDM backlog to increase, the facilities department sought other ways to increase its budget, including redirecting overhead,

low-interest loans, percentages of research grants, and overhead cost recovery.

The University of Maryland has a flat utilities budget of approximately $23 million. Over the last several years, it has developed a plan to reduce energy consumption and save significant amounts of money.

- Supply-side Energy Savings—By becoming more energy efficient, the university will save money through reduced energy consumption. The majority of the savings will come through new technologies, such as cogeneration and trigeneration. The university will reinvest these savings into infrastructure renewal, which will create a self-perpetuating savings cycle: the more efficient infrastructure renewal projects generate further savings.
- Demand-side Energy Rebates—The University of Maryland's efforts to make the campus more energy efficient have paid off in almost $3 million in rebates from the local utility company. The university has increased energy efficiency with occupancy sensors, variable frequency drives, window films, and electronic ballasts—all of which qualify for rebates from the utility companies. An independent consultant estimates that the university has eliminated almost 90 percent of the energy inefficiencies.

The University of Maryland further maximizes its position as the largest consumer of utilities by taking advantage of low-interest loans offered by the state. Its central control and monitoring system (CCMS) energy management system was funded by a $7 million low-interest loan.

When a department receives a research grant, the facilities department receives a small percentage of the funds. In most cases, the university dictates that the facilities portion of the grant be used to improve the academic

department of the professor who received the grant. This will lead to increased productivity and greater likelihood of receiving more grants. Faculty play a large role in determining which improvements are made to the facility. However, in updating the academic department's classrooms or labs, the facilities department can eliminate a portion of the building's CRDM.

By redirecting overhead cost and maximizing opportunities with low-interest loans and research grants, the facilities department generates a supplementary budget which can be reinvested in any way it chooses. The department targets this supplementary budget toward infrastructure renewal.

Reinvesting in Infrastructure Renewal

The university reinvests all rebates and savings in infrastructure renewal, and estimates that once it reaches total efficiency it will have earned up to $6 million in overhead reduction. It continues to work to maximize efficiency and has enlisted help from the board of regents, an interagency group, and consultants. Opportunities for further possible reductions include better purchasing of natural gas and better brokering. In addition, once utilities are deregulated, the university will be able to purchase electricity and other utilities from the most competitive provider.

Goal: System-wide Facilities Auditing Process

Because of its strong facilities engineering staff and innovative CRDM funding, the University of Maryland has proven itself to be a leader of efficiency and asset management. Additionally, it also has a facilities audit specialist and an information services group. The state asked the university for help in developing a system-wide auditing process that

would consistently and objectively evaluate the CRDM needs for all 11 state schools.

The Problem: "Apples to Oranges" Comparison

While each university had its own audit system ranging from Harvey Kaiser's *The Facilities Audit* handbook to detailed consultant surveys, the results were often difficult for the state to compare because they used different formats and inspection methodologies. The state found itself trying to compare apples to oranges. In an effort to allocate the funds accurately, it called for the creation of a more detailed and consistent method of measurement that could be used to analyze the needs of each university.

The Solution: A System-wide Auditing Process

The University of Maryland facilities management team is developing an auditing process that will be used by each school to assess its CRDM status and needs. The team selected which systems to assess and developed a system for assessment. Their list of systems is detailed in Exhibit A.

The assessment system is quite detailed and uses a "condition assessment" in which each of several areas is rated by priority. Each area contains directions on how and when it should be evaluated and how to select the priority level. The definitions of each priority level are exact and detailed. An example begins on the next page.

Jim Piper is producing all the assessment procedures, forms, directions, and software. The university operates a Web page through which the other state universities can access this information.

Example

Facility Assessment—Built-Up Roofing

Item 7—Correct Ponding: The best method used to examine a roof for evidence of ponding is to walk the roof 24 hours after a moderate to heavy rain has ended. If there is standing water on the roof at any location, the roof has a ponding problem. Estimate the total square footage of the roof that is impacted by ponding and enter the value in the description section. Note the location of areas impacted by ponding on the roof sketch. Rate the priority of repairing the roof ponding problem as follows:

0 No action required
1 Ponding of small areas less than five feet in diameter and less than ½ inch deep
2 Ponding that extends less than 10 feet in diameter and less than one inch deep
3 Ponding less than 15 feet in diameter and less than one inch deep
4 Ponding greater than 15 feet in diameter and more than one inch deep

Representatives from each of the universities' facilities departments will attend a training program in which University of Maryland will show them how to use the forms and evaluate each of the elements to be assessed. This training program will ensure that each of universities has accurate methods of assessment and is using the same priority ranking.

Each university will implement its own assessment. It will then report this information to the information services group within the University of Maryland's facilities department.

Centralizing Funding Through the System

The University of Maryland's creative plan to increase infrastructure CRDM funding establishes them as leaders in facilities management. Because of this leadership, the state asked the university to develop a system-wide facilities auditing process to evaluate the CRDM needs of each state university. Frank Brewer and Jim Piper responded by developing a detailed system that each of the state's 11 universities can access via the World Wide Web. The system provides each school with the directions and forms needed to perform an accurate and consistent evaluation of facilities conditions. In 1996, the state of Maryland centralized all funding through the university system. Rather than each university appealing to the board of regents for project-specific funding, all funding will come through the centralized state system. The system-wide facilities audit process creates a consistent evaluation of each of the state university system's 11 schools and allows equitable allocation of all state funds.

Exhibit A

Facility Assessment Program
Systems Being Assessed

1. Mechanical Systems
   - Boilers
   - Chillers
   - Cooling towers
   - Hot and chilled water systems
   - Air handling units
   - Potable water systems
   - Sanitary sewers
   - Utility sewers

2. Electrical Systems
   - Transformers
   - Switchgear
   - Lighting
   - Distribution systems
   - Standby power systems
   - Elevators and escalators

3. Building Shell
   - Roofs
   - Foundations
   - Exterior walls
   - Doors
   - Windows

4. Building Interior
   - Ceilings
   - Walls
   - Floors
   - Doors
   - Restroom facilities
   - Special systems

5. Safety Systems
   - Building security
   - Fire safety
   - Hazardous material storage

6. Building Site
   - Benches
   - Curbing
   - Landscaping
   - Parking
   - Retaining walls
   - Roads
   - Walkways

7. Plumbing
   - Domestic hot water distribution
   - Potable water
   - Sanitary sewer
   - Water heater
   - Water storage tanks

8. Transportation
   - Dumbwaiters
   - Elevator
   - Escalator

9. Utilities
   - Chilled water
   - Electric
   - Heating water
   - Sanitary sewer
   - Steam
   - Storm sewer
   - Water

LOUISIANA STATE UNIVERSITY

Louisiana State University (LSU) first established itself as a leader in facilities renewal when its self-funded energy renewal project won the Association of Energy Engineers' award for 1995 Project of the Year. LSU built a plan to eliminate a statewide CRDM backlog of more than $100 million and achieve facilities equilibrium in all of higher education facilities in Louisiana. Short term, the university was to raise funds through a multi-million dollar bond issue with the debt-service paid by student fees and to improve efficiency through self-funding energy projects. Long term, LSU will maintain equilibrium through increased state funding and an established maintenance reserve for all new buildings.

Louisiana State University, founded in 1860, is the flagship of higher education in Louisiana with a designation as "Research University I." The campus is located on 1,700 acres on the east bank of the Mississippi River in Baton Rouge. The campus consists of more than 9 million square feet in more than 300 buildings that serve the needs of more than 27,000 students and 4,550 faculty and staff. It was constructed on its current site in the 1920s, and many of the buildings are in Italian Renaissance architecture. Forty-seven buildings are on the National Historic Register.

Over the years, rapid facilities expansion, inferior quality buildings, legal mandates, and state budget problems contributed to LSU's increased CRDM backlog. State funding

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has decreased 20 percent, or almost $109 million dollars in aggregate, since 1986. In addition, a state constitutional change has limited the total state general obligation bond indebtedness which limits the amount of funds available for all state facilities.

However, Joe Kelley, P.E., M.P.A., chief facility officer, developed a plan that will completely eliminate the state's CRDM backlog and provide enough funding to ensure facilities equilibrium. Kelley's plan includes short-term DM funding, short-term bond issue, energy savings plans, long-term annual CRDM funding, and a policy that mandates funding for all new construction including a maintenance reserve fund. With this plan, the state was to generate $100 million in one-time funds by the year 2000 and completely eliminate the CRDM backlog. It further assures perpetual funds to prevent the reoccurrence of the budget problems.

CRDM Funding History

Like many universities, Louisiana higher education facility maintenance and the associated funding problems began in the late 1940s and 1950s when LSU began to rapidly expand facilities to accommodate the World War II veterans returning to college. The rapid expansion continued throughout the 1960s and 1970s as baby boomers filled the universities. Because the demand for classrooms, labs, and other university facilities was so great, construction quality and future minimum maintenance were not primary concerns.

While these demographic trends impacted universities nationwide, the state of Louisiana was particularly affected because it does not have laws or guidelines governing minimal design standards for permanent facilities. The state has and enforces building codes through the State Fire

Marshal's Office and the State Health Department, but these codes deal only with life safety issues and do not insure quality HVAC or roofing systems. Louisiana has recently undertaken the task of establishing campus design guidelines and minimal quality standards. However, as a result of past policies, LSU now has a CRDM backlog of $46.2 million.

Between the 1983-84 and 1995-96 academic years, the campus size increased by 32 percent, while the maintenance budget decreased by 15 percent and staffing was reduced by approximately 150 positions. The net result was a 15 percent reduction in maintenance expenditures in 1984-adjusted dollars, decreased from $2.87 per square foot in 1983-84 to $2.44 per square foot in 1995-96. As a result of this drastic cut, maintenance activity went from proactive to reactive, and major projects were deferred. While LSU has decreased DM $8 million through funds generated by energy savings and reallocation of campus funds, the DM backlog is still $46.2 million.

Increased Autonomy

While the current DM backlog of $46.2 million may seem overwhelming, Kelley's plan was to completely eliminate CRDM backlog in the next five years and provide enough funding to assure facilities equilibrium. Two recent successes have helped clear the path for increased autonomy and credibility. The recent increase in project authority from $150,000 to $300,000 illustrates the department's greater autonomy, and its award-winning energy program built credibility.

Before 1995, the state legislature required that all projects greater than $150,000 be approved in capital outlay. Funds for these projects came from cash or general obligation

bonds rather than campus operating funds. Typical capital outlay projects were roof and utility line replacements. However, as the state's fiscal problems continued, state colleges and universities became more dependent upon capital outlay. In 1995, the state legislature increased project authority from $150,000 to $300,000.

Increased Credibility Through Award

LSU proved its ability to achieve facilities excellence with a limited budget when they entered into a shared savings energy contract that produced a self-funded, highly efficient energy system.

The Louisiana state legislature allows institutions to enter into shared savings contracts if the saving are great enough to fund the project. LSU's shared energy savings contract has certainly been self-funding, and has benefited the university in other ways, as well:

- Decreased Utility Costs—The new system has decreased utility costs by $3.4 million annually. While annual utility bills formerly cost LSU $12.8, they now cost $9.4 million.
- Reduced DM—By retiring the old energy generating system, LSU eliminated 200 pieces of outdated equipment and reduced DM by $5 million.
- Expanded Capacity—The new energy system has expanded capacity 20 percent, and expanded potential capacity by 40 percent.
- Generated Savings—As a result of the energy saving project, LSU has incurred more than $480,000 in annual net savings.

Because of its success, LSU's energy savings efforts received the Association of Energy Engineers' award for 1995 Project of the Year. More importantly, this project was evidence that through innovative thinking, LSU could both

generate savings and increase efficiency. As detailed below, LSU saved over $1,289,945 through energy projects over three years.

Energy Project Total Savings	
Total Savings	$7,537,927
Lease Payments	(5,441,704)
Insurance Costs	(63,339)
Maintenance Costs	(742,939)
Project Savings	$1,289,945

Strategic Plan to Eliminate CRDM Backlog

Encouraged by their success with the shared energy savings contract, LSU developed a plan that addresses both the short- and long-term issues of eliminating the CRDM backlog and ensuring future facilities equilibrium.

Item 1: Short-term

DMWhile Louisiana public institutions of higher education await a more formalized, long-term plan, Kelley's plan calls for deferred maintenance funds of $30 million through the operating budgets. The purpose of this interim budget item is to insure that critical projects can continue until other funding measures are in place.

Item 2: Fees and Bonds

Kelley also recommended a combination of a student building use fee and bond issue. A portion of the revenue from the bond issue would be used as debt service on the bond. Both the fee and the bond issue, however, require legislative approval.

Many universities are now charging their students a building use fee each semester they register. This plan shifts a portion of the cost of maintaining higher education facilities from the general taxpaying public to the user of the facility. The table below presents a comparison of some of the building use fees charged by other higher education institutions.

Institution	Use Fee
Texas Tech University	360.00
University of Houston–UP	360.00
University of Texas–Austin	360.00
Texas A&M University	300.00
University of North Texas	240.00
Florida State University	142.80
University of Alabama–Birmingham	141.00
Louisiana State University (Proposed)	**50.00**
Auburn University	$ 30.00

If all Louisiana public institutions of higher education were to charge $50 per year per student ($25 per semester), it would generate more than $7 million annually. To prevent this fee being perceived as a tuition increase, university administrators would clarify that it is a temporary measure. After the bonds are retired in 15 years, the student fee would be discontinued. Of this $7 million, $5 million could be used as debt service on $50 million 15-year bond issue. This would fund approximately half of the current system-wide CRDM $100 million backlog.

Item 3: Energy Savings
Kelley's plan also requires institutions to have a plan to generate and leverage energy savings by March 1, 1997. He planned to present these energy savings plans to the state legislature in spring 1997, seeking $20 million in funding for energy renewal projects.

As detailed earlier, LSU experienced strong success with its shared savings contract that earned the 1995 Project of the Year Award from the Association of Energy Engineers. This success is likely to encourage participation by member universities and approval for funding by the state legislature.

Item 4: Funding
The plan calls for the legislature to include minimum annual funding for capital renewal, replacement, and preventive maintenance to be increased over a five-year period to equal annual needs.

Item 5: Maintenance Reserve for New Buildings
All new construction and major renovation projects will be funded at 110 percent of cost to allow for development of a maintenance reserve fund. The 10 percent over the cost of constructing or renovating the building will be invested in a reserve account to be utilized over the life cycle of the facility for future capital renewal and replacement needs. Assuming a 3 percent average inflation level and a 10 percent return on invested funds, sufficient capital renewal and replacement funds would be available in perpetuity in the reserve account. This assumes, of course, aggressive investing and careful use of the reserve fund. This plan, if approved by the legislature, gives the universities a one-time $100 million fund that will

eliminate CRDM backlog. Items 4 and 5 ensure that funds are available on a perpetual basis thus creating facilities equilibrium.

Governor Foster to the Rescue

Before Joe Kelley had an opportunity to present his plan to the legislature, a change in state leadership resulted in more funding for higher education. Governor Mike Foster had run on a platform that placed high priority on education. An LSU graduate, he fulfilled his promise to provide funding for university facilities and also increased faculty pay to national average levels. The plan approved by the legislature in 1996 includes $30 million in special funding for the 1996-97 academic year, and $30 million per year for the next four years with a promise of a new funding formula to ensure timely capital renewal and replacement in future years.

Conclusion

The new legislation-driven funding enables LSU to move toward facilities equilibrium more quickly. The additional funding ensures that LSU will eliminate their system-wide CRDM backlog of more than $46 million, without such measures as a building fee or a bond issue. LSU's Joe Kelley has developed a plan that will completely eliminate CRDM backlog in the next five years and achieve facilities equilibrium.

For more information, visit the LSU Facility Services' Web site at http://www.ppl.lsu.edu.

JEFFERSON COUNTY (COLORADO) SCHOOL DISTRICT

Through an innovative bond issue, the Jefferson County School District has decreased its CRDM backlog by $200 million in only four years. Today, its total CRDM is less than $400 million, down from nearly $600 million. It has achieved this despite an amendment to the state constitution that greatly limits the amount of state funding available to Colorado schools. Close contact with and support of its community has enabled the Jefferson County School District to decrease the backlog and establish a plan for backlog decreases and facility improvements through the 2002-03 school year.

This metropolitan Denver county was mainly a farming community until it experienced rapid residential expansion in the mid-1950s. The completion of the Federal Center in 1956 and continued growth by local companies such as Coors and Martin Marietta led to an increase in residential area and the need for more schools. Today, the Jefferson County School District includes 92 elementary schools, 18 middle schools, 16 high schools, 12 district-wide and special use facilities, and 5 support facilities.

Funding History

The State of Colorado distributes general fund monies among state schools according to a funding formula which also determines the level of local property taxation. While funding was always limited, it was not decreased in 1992 when the state added Amendment 1. This amendment

limits increases in the mill levies for local property tax, increases in revenues and increases in expenditures. State law also limits the amount schools can borrow and specifies that bond issues must be approved by the school district electorate.

The West Jefferson County Chamber of Commerce is very involved with the community financial affairs at the request of both its individual and business members. As community property and business owners, the Chamber of Commerce members have a vested interest in maintaining a strong local economy, limiting taxes, and creating outstanding schools. These efforts ensure that the county attracts a strong and qualified workforce to maintain the economic viability of the community. The chamber focuses closely on the activities of the county school board and the cost and quality of Jefferson County schools.

After closely scrutinizing the Jefferson County School District's board actions, funding, facilities, and financial status, the Chamber of Commerce recommended that the school district greatly increase the amount of funding for capital improvements. Because tax dollars are so limited in the school district, it suggested a bond issue that would double or triple the amount of funding per student.

Updating Capital Improvement Plans

Jefferson County School District's 1992 to 1997 Capital Improvement Program has been very successful. A performance audit conducted in 1994-95 was quite complimentary of the program management; also a recent public opinion survey revealed the high levels of satisfaction.

In 1992, the Jefferson County School District had a CRDM backlog of $582 million. Between 1992 and 1996, Jefferson County School District raised $380 million through bond

and capital reserve funding sources. In 1996, CRDM has been reduced to less than $500 million, but backlog continues to grow due to the following factors:

- Aging and Deteriorating Infrastructure —The district's building infrastructure continues to age and deteriorate. By the year 2000, many of its buildings and components will reach the end of their serviceable life.
- Increased Construction Cost Index—The construction cost index (inflation) rose more than 16 percent from 1992.
- Technology—The district needs facility and infrastructure improvements to accommodate changes in technology and educational programs.
- Increased Enrollment—As the Jefferson County area continues to grow, student enrollment grows proportionately. Within the next five years, enrollment is projected to increase by about 7,200 students.

Changes from the 1992 Plan

Jefferson County School District will reinstate many of the processes used to define needs. Initiated processes include the normal adjustment to the backlog as needs arise during the year, an in-depth review of each facility by a member of the facilities planning and design department, and meetings with the building principals, engineers, staff, maintenance personnel, and parent representatives. The school district will continue to review all findings with members of the physical services department.

Jefferson County School District experienced a learning curve during this successful experience, and will incorporate its new knowledge in the form of several changes to their plan for the 1997-98 to 2001-02 program. Changes include increased and more accurate budgets, especially in the following areas:

Budget Increases	Amount (millions)
Building Renovations and Additions	$25.8
Updated Intercoms	4.6
Approved Playground Apparatus	1.0
Traffic Circulation Improvements	7.7
New Senior High School	20.0
New/Improved Junior High Facility	18.0
Replace Shaffer Elementary Facility	6.0
Add or Replace Air Conditioning	9.8
Total	**$92.9**

Project Priority List

Jefferson County School District prioritizes projects by criteria outlined in board policy. This allows the district to make the most efficient use of its money without placing one school's needs above any other.

Priority Group I—Essential Projects

This group includes projects that are essential and critical. These projects must be completed as soon as feasible.

- Health and Safety Concerns—Water supply may become contaminated, poor traffic patterns that endanger pupil safety, etc.
- Mandates by Statute—Code violations and asbestos abatement projects
- Necessary to Avoid Building Closure—Leaking boiler and cracked combustion chamber in a furnace
- Prevent Damage—Extensive roof leaks that can cause interior damage and severe erosion along foundations and footing

- Retard Deterioration or Prevent Increase in Cost—Minor roof deterioration or repairs that will accelerate if not corrected, extensive deterioration in pavements that could adversely affect subgrade conditions if not repaired

Priority Group II A—Necessary Projects

This group includes projects necessary to support a facility's mission and purpose. Although they are important in nature and need to be accomplished as soon as possible, they are not as critical and urgent as those projects in Group I. Group II A projects should be accomplished in the next five years and include:

- Necessary Maintenance and Repairs to Maintain the Integrity of the Building—Replacement of equipment and systems that have served their useful life (boilers, roofs), repainting a building, carpet replacement, pavement reconstruction, and overlay work
- Projects That Support Existing Programs—Music and Art room additions, renovation of open space classrooms, and acoustical treatment in instructional areas
- Projects That Support Expansion of Programs—Computer classroom additions, photography laboratory additions and improvements
- Projects That Provide Operational Efficiencies and Economies—Energy conservation projects

Priority Group II B—Desirable Necessary Projects

Projects in this group are identical to those in Group II A except that they may be deferred beyond five years.

Priority Group III—Desirable Projects

This group includes desirable projects that improve the environmental qualities of a building or site, i.e., landscaping work, trash dumpster enclosures, etc.

Building Community Support

The financial success of the Jefferson County School District is largely due to the support of the community. Facility managers build community awareness by publicizing the school district's financial need and its need for an asset management plan. The facility managers attend meetings of community groups such as PTA and Kiwanis and make presentations detailing the school district's need. A video that clearly illustrated facility needs was created by Communications Services. The video documented the district's decaying facilities any how facility conditions affected classroom instruction and learning environment.

Amendment 1 makes all bond issues subject to approval by the Jefferson County voters. To ensure that the voters approve the amount necessary, the facility management team coordinates an extensive public relations program to present the district's requests. It details the facilities' funding history and illustrates the facility conditions through videos that demonstrate how these conditions affect instruction. The videos have been highly successful and built the support necessary to have the bond issue approved by the voters.

The facility management team's goal was to identify how much of a financial commitment the community was willing to make to improve and maintain its schools. To determine what the community regarded as a reasonable financial commitment, the facility managers employed the following outreach methods:

- Polls—a professional pollster accurately predicted that the community would approve a $325 million bond issue, but community support dropped with a bond for more than $350 million. The focus poll revealed that the community placed a high value on visible and

tangible improvements such as roof repair and air conditioning.

- Focus Groups—revealed which capital improvements the community would support and value.
- Informal Discussions—at local organizations a presentation by a facility or other trained speaker and the opportunity for community members to express their concerns. The managers listened carefully to these discussions and incorporated the group's consensus into budget plans.

By staying in close contact with the community and identifying their priorities and limitations, the facility management team was able to present bond issue proposals and budgets that earned the support of the community.

Proposed 1997-98 to 2002-03 Capital Improvement Program

Based on the success of the 1992 Capital Improvement Plan and the school district's new level of expertise acquired through its management, the school district proposes both bond and capital reserve fund projects. A successful bond election, increasing the contribution to the Capital Reserve Fund annually, payoff of certificates of participation in December 1998, establishment of the Technology Internal Service Fund, and replacing support vehicles through the Fleet Maintenance Internal Service Fund will allow the district to face the 21st century with a sound asset base. Details of the proposed plan appear in Figure A.

Figure A:
Proposed Five Year Expenditure Plan
1997-98 to 2001-2

	Capital Reserve Fund	Bond Fund	Total Program
Resources			
Beginning Balance	$439,000	—	$439,000
Bond Proceeds		196,000,000	196,000,000
Transfer From General Source	93,300,000		93,300,000
Interest on Other Revenue	5,300,000	18,000,000	23,300,000
	$99,039,000	$214,000,000	$313,039,000
Expenditures			
New/Replacement Buildings		63,716,800	63,716,800
Additions/Renovations		65,838,600	65,838,600
Environmental Compliance		1,503,000	1,503,000
Mechanical/AC		34,141,100	34,141,100
Plumbing/Electrical		30,980,800	30,980,800
Roof Replacement	8,087,700		8,087,700
Pavement/Traffic Circulation	13,312,000		13,312,000
Site Improvements	8,300,000		8,300,000
Furniture and Equipment	12,300,000		12,300,000
Communications/Alarms	3,817,000		3,817,000
Unscheduled Projects	17,743,300		17,743,300
Temp. Building Relocations	2,500,000		2,500,000
Bus Replacement	12,750,000		12,750,000
Certificates of Participation	15,550,000		15,550,000
Remainder from 1992/1997	1,079,000		1,079,000
Contingency, 1992/97 Bond	3,600,000		3,600,000
Contingency, 1997/02 Bond	—	17,792,700	21,792,700
	$99,039,000	$214,000,000	$313,039,000

The positive responses to the survey indicate that there is support for a continuing Capital Improvement Program. When initiating the 1992 to 1997 program, Jefferson County Public School District identified projects as Priority I through II A (detailed earlier). Using the same method of prioritization, the district is proposing bond projects totaling $240 million to $280 million for the 1997 to 2002 program.

Maintenance Management

With more than 138 schools and special education facilities to maintain, the Jefferson County School District's maintenance staff is highly efficient. Jefferson County schools are divided into eight zones. Each zone has its own maintenance crew that rotates among the different schools within that zone. The crews include plumbers, electricians, HVAC technicians, and moderate construction crews. They handle all routine service calls and maintenance items, as well as minor construction projects.

Because the crews rotate and serve several schools within a zone, they communicate through a computerized maintenance request center. A member of any school can submit a maintenance request, and a member of the maintenance staff can retrieve the messages remotely.

To maximize their time, maintenance crew members operate out of decentralized shops, or fully equipped vehicles. They carry most of the necessary tools and materials and have up to $300 in petty cash available for purchases. This prevents repeat trips to the main shop and maximizes the amount of work the staff can complete within a day. These procedures also enable the maintenance staff to prevent any potential damage that could occur while they were obtaining the appropriate tools and materials.

Conclusion

Through an innovative bond issue, the Jefferson County School District has decreased its CRDM backlog by $200 million in only four years. Today, their total CRDM is less than $400 million, down from more than $600 million. They have achieved this despite an amendment to the state constitution that greatly limits the amount of state funding available to all Colorado schools.

Close contact with and support of its community enabled the school district to create awareness of the facilities' needs and identify the community's level of commitment to improve and maintain the district's facilities. The success of its plans to date and their decreased backlog have enabled the district to establish a plan for continued backlog decreases and facility improvements through the year 2002-03. Voter opinion poll, taken in April 1997, indicates that the school district has a favorable public climate to begin a campaign for another bond issue in November 1997.

ATTACKING DEFERRED MAINTENANCE IN CANADA*

by Jo Anne Sommers

From a distance, many of Canada's university campuses appear impressive. But look again. Up close, the sight is less attractive. Paint is peeling, roofs are leaking, in some cases the rot is obvious. Less apparent are corroded water pipes, obsolete electrical systems, and aged cooling equipment. It all adds up to a massive headache for administrators, one with a collective price tag in the billions of dollars.

The deterioration is the result of several factors. Many university buildings were constructed during the boom years of the 1960s. Their components and mechanical systems, which have an average life span of 25 to 30 years, are wearing out en masse. Ironically, they are often in worse condition than older buildings, which incorporated simpler systems and higher building standards.

Environmental standards have changed. Asbestos, once a popular insulation material, is now recognized as a health threat. While a considerable amount has been removed in recent years, much remains to be done. And asbestos disposal is governed by strict regulations, which makes it a costly undertaking.

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Older cooling systems require ozone-depleting refrigerants, many of them no longer available. Aging chillers leak, losing 5 to 15 percent of their refrigerant charge annually and while substitute refrigerants are available, their cost is escalating rapidly. Eventually the chillers will have to be converted or replaced.

Fire and building code changes intensify the problem. Fire safety upgrades are needed, particularly with respect to flammable liquid storage. Many buildings are inaccessible to people with physical disabilities. Elevator upgrading and wheelchair ramp installation are needed to meet today's standards.

Meanwhile the annual level of funding for building renovations and equipment replacement has grown little, if at all, since the 1970s. The result is a vicious cycle of increasing demands for major repairs and replacements.

The University of Manitoba is a good example. Over most of the past two decades, its annual renovation and equipment allocation was about $3 million, falling to $900,000 for 1995-96. Meanwhile, the estimated cost of deferred maintenance has climbed to $102.2 million, of which $30 million to $40 million is considered urgent. A recent report from the university's physical plant department says that only the most critical items are addressed. However, a growing number of major incipient problems are left festering.

The university will receive $5 million from the Manitoba government to assist with fire safety upgrades. While Terry Falconer, vice president, administration, is pleased, he says it will do little to improve the situation overall. "Ironically these upgrades are not really related to our infrastructure problems. However, they're a top priority because of the legal implications. Some of the most pressing issues aren't addressed because there's no legal issue involved."

Falconer says it's easy for funders to ignore infrastructure problems, especially when money is tight. "No jobs are at stake and much of the deterioration, such as drafty windows and poorly maintained service tunnels, isn't obvious."

Nevertheless, improvements are urgently needed. Like all universities, the University of Winnipeg's top priority is health and safety. But other needs are also pressing. Unless the university upgrades its animal care facilities, for instance, it will risk losing millions of dollars in government research funding and jeopardize its standing in the academic community.

According to Dave Riddell, it will cost about $1.8 million to renovate the animal quarters in the University of Western Ontario's Medical Sciences Building. "It's almost a code compliance issue and could put our research funding at risk," explains UWO's senior director, physical plant and capital planning services division.

Ridell says Western considered demolishing the building and starting over but decided to renovate instead. The trend is to maintain existing buildings, assuming they can be renovated to meet current and future needs, he explains. "It's a matter of cost: we completely renovated our chemistry building for $7.5 million. A new building would have cost millions more, including the expense of waste disposal, which is prohibitive."

Western estimates its deferred maintenance bill at more than $100 million. Improvements are needed to the ventilation system, water control, the power plant, and the heating and cooling systems.

The university is taking steps to address the issue. The results of a 1994 facilities audit were taken into consideration when Western formulated its strategic plan. As a result, the university is committed to spending stepped amounts

of $750,000 annually for the next ten years, starting in 1996-97.

When it undertakes new construction projects in the future, Western may build a facilities protection formula into the cost projections. A surcharge of perhaps $50 a square foot would be set aside in the form of an endowment fund and the interest used to cover operating costs and future capital renewal needs.

McMaster University may adopt a similar approach, says Physical Plant Director Bob Carter. The university's planning and priorities committee is studying various strategies as part of its facilities rationalization process. "We're selling off some of our unused campus property and may close or rent additional unused space," Carter says.

McMaster plans to conduct an audit of its campus facilities. An older study estimated the cost of deferred maintenance at $32 million, but Carter believes the new figure will be significantly higher.

One way to assess the extent of the deferred maintenance problem is to determine a university's facilities condition index (the dollar value of deferred maintenance as a percentage of the current replacement value of the facility). If the index is below 5 percent, a university is considered to be in good shape. If it's 5 to 10 percent you're in fair condition; higher is poor.

By this standard, St. Francis Xavier University is in dire shape. Leon MacLellan, director of physical plant, estimates deferred maintenance needs at $17 million to $18 million, or 20 percent of the replacement value of the university's academic buildings. "A-1 priorities are probably worth $3 million to $4 million," he adds.

Administration is well aware of the extent of the problem, says MacLellan. "The president has met regularly with the board to discuss the issue, and to look at what's been achieved and what lies ahead."

Nova Scotia universities face a unique challenge in that it is the only province with a net inflow of students. "It puts an even greater strain on our infrastructure and resources," says Bill Lord, Dalhousie University's director of physical plant and planning. "The more successful we are at attracting new students, the harder it becomes to cope."

Dalhousie's deferred maintenance cost is estimated at $30 million, of which $5 million to $6 million is considered absolutely essential. The university's audit committee is studying a recent report on the situation and Lord hopes to make deferred maintenance a part of the overall strategic plan. This may have to wait until after the merger with the Technical University of Nova Scotia is complete, however.

"We're trying to tackle one major project at a time and get the biggest possible bang for the buck," says Lord. "For instance, we try to replace an entire roof rather than just patching it." Recent projects include a $10 million refit of the Tupper Building, including upgrades to the elevators, heating, and air conditioning controls.

Lord is encouraged by the fact that the deferred maintenance problem is achieving greater visibility. Even governments are beginning to take it more seriously. The province of Alberta just announced that its universities will receive $35 million for deferred maintenance and health and safety needs over three years, starting in 1997-98. The University of Alberta, the province's oldest postsecondary institution, will receive about $10 million, estimates Glenn Harris, vice president, finance and administration. With a deferred

maintenance backlog of $300 million, the university won't have any difficulty spending the money, says Harris.

Chuck Adler, McGill University's physical resources manager, is also optimistic. Five years ago, McGill put its deferred maintenance bill at $200 million; since then it has been reduced to about $160 million. A new law library and an engineering building were recently completed as part of a major capital campaign.

"For the first time, capital renewal is being seen as a priority. Universities are doing a good job of sensitizing governments to the issue. They now realize that there's no point adding to high level teaching and research facilities without dealing with this issue first. After all, there's nothing worse than putting an expensive new lab into a building that's falling apart."

Payback Time

There is a silver lining to the facilities renewal cloud. Improved standards and systems often enable universities to realize significant operational savings.

Bob Carter of McMaster University recommends performance contracting, which allows universities to borrow money for upgrades and repay it with the savings realized through reduced utilities costs. McMaster is in the midst of a cooling plant upgrade that will cost about $2 million and pay for itself in three to four years, he says.

Once the loans have been repaid, Carter hopes to establish a program to maintain the utilities budget at the same level and use the difference between old and new costs to address future deferred maintenance needs. "That's a challenge," he admits, "because the administration usually wants to scoop up the savings and direct them to other needs."

As part of a total renovation program, Dalhousie completely relamped the Killam Library and installed a heat reclamation device. They saved more than $100,000 on the cost of lighting this year alone and expect the renovation to pay for itself within two years."We installed completely new fixtures in the Tupper Building for less than the cost of relamping," adds Bill Lord. "We expect to save $75,000 a year as a result."

Some benefits of capital renewal are more subtle. Dalhousie installed a new ventilation system in its medical research building, which has resulted in significantly improved air quality.

"The old system was designed for an office building and recycled the existing air," Lord explains. "The new system changes the air completely seven times an hour. We've already seen a big improvement with respect to sick time among the employees who work in the building."

Finding the Cash

With government resources scarce, universities are adopting creative approaches to fund raising for capital renewal purposes. One avenue is to seek private donations, which, officials readily admit, can be a tough sell.

McGill is seeking private funding for capital renewal purposes for the first time, says Derek Drummond, vice principal, development and alumni relations. "It's hard to raise money for deferred maintenance, especially for buildings without much historical significance. We may have some success getting in-kind donations from corporations, foundations, or individuals interested in heritage issues. But it's difficult to get alumni to contribute for this purpose. After all, no one ever graduated from an HVAC system."

"We can't sell facilities renewal to donors by itself," agrees McMasters' Bob Carter. "We have to wrap it up as part of an institutional renewal package that includes faculty as well as facilities renewal. After all, improved facilities are often required in order to deliver programs effectively, particularly in research institutions."

One strategy is to make capital renewal an element of a new project. The University of Western Ontario recently expanded its law library. It was easy and practical to design the expansion to incorporate the renovation and expansion of several adjoining classrooms, says Peter Mercer, vice president for administration and general counsel.

Western plans to launch a 125th anniversary fund raising campaign that will require a different strategy than those used in the past, adds Ted Garrard, vice president, external. "One approach is to arrange strategic matches between donors and particular projects. We want to shape the campaign to ensure that operating funds are built into cost projections and educate people that you can't deliver programs without adequate infrastructure."

CONCLUSION

Creating Your Own CRDM Success Story

Each of the institutions detailed in this book personifies the new era of facilities management—each is resourceful, strategic, and determined. Each institution has acknowledged its need and developed a strategic plan to eliminate CRDM backlog. Although the level of need, availability of funding, and the strategy to secure funding differs from one institution to the next, each institution achieved CRDM success through the same five steps: assessment of need; building of support within the university community; identification of funding options; presentation of the strategy to the decision-making body; management of the strategy.

Assess Need

A facilities audit is the first step to assess your institution's need. While an audit may be conducted by a team from within the facilities maintenance department or by a professional engineering consultant, the goal of a good facilities audit is to minimize costs, maximize results, and yield data that is comparable with that of other institutions. Regardless of who does the research, a meaningful audit will take time, resources, and attention to detail. While political motives often influence the audit process, the fundamental reasons to undertake the condition audit process are to:

1. Substantiate the need for renewal resources
2. Determine specifically where renewal resources are needed
3. Create a sense of accountability for facility portfolio format

4. Compile baseline facility condition data that can be benchmarked against peer and national statistics
5. Initiate the conversion from reactive, emergency maintenance to planned and preventive maintenance

To be successful, an audit must be repeatable as part of an ongoing process to continually monitor the state of facilities. Facility conditions are constantly changing, and audit repeatability allows the facilities department to document the degree of the facilities' need, as well as the department's success in maintaining the facility.

Ensure that the data collected in your audit is clear by using individual projects itemized for each building. These projects are stand-alone line items if they have a cost over $5,000. Smaller projects are grouped together into meaningful groups. Projects are best classified in the Construction Specifications Institute format. Prioritize projects based on 1) risk to human life or safety, 2) risk to the facility and its systems, 3) return on investment ranking, and 4) overall ranking based on expected life cycle failure.

APPA and NACUBO have published some guidelines that form a good basis for uniform auditing, including the four basic categories—deferred maintenance, capital repair, routine maintenance, and plant adaptation. Many institutions, such as University of Maryland, have created their own facilities assessment tools to be used system-wide. Whichever format you choose, make sure that it is comparable and compatible with the reporting standards of your institution, system, state, and APPA/NACUBO.

This publication presents institutions that successfully created their own repeatable facilities audit format, as well as those who used professional engineering consultants. Either form of audit can work equally well providing that it can be used numerous times to yield meaningful data.

When your CRDM needs are fully identified and quantified, you have the tools you need to build support among those who influence or control the budget.

Build Support

The institutions that succeed do so with the help of allies and supporters. These supporters may be high-profile politicians, like Louisiana's Governor Foster, or they may come from the local Kiwanis or Rotary club on grassroots level as in the Jefferson County School District case. Although the number or prestige of the allies may differ, the unifying factor is that all of these institutions had a strong enough vision of eliminating CRDM backlog to garner support from others. The strength of this vision comes from the enthusiasm that helped create it, and the passion with which its proponents promote it.

Once you identify your facilities' need, gather support from all levels by publicizing the nature of your program and the value of the facilities involved. Once those who benefit from the facilities recognize the importance of renewal, their support will help create the powerful momentum of the institutions featured here.

Use creative resources to publicize your facilities' conditions—if you cannot take your allies on campus tour, use a video that depicts the state of facilities and how it affects the learning and teaching environment. Work within your community, legislature, and university to publicize facilities needs through presentations, and further build support from within the community by asking your allies to serve on your boards and committees. Keep your allies abreast of any progress or setbacks in facilities management through newsletters, updated video tours or regularly scheduled presentations.

The relationship between facilities managers and the community is a win/win relationship—the facilities managers benefit from the support of the community, and the community inevitably benefits from the intellectual environment, economic impact, and beauty of the well-maintained institutional facility.

Identify Funding Options

Determined facilities managers have triumphed even in the most competitive funding environments because they were open to a myriad of funding options. As institutions create awareness among legislatures about the value and benefit of the institution's facilities, legislatures increase their willingness to appropriate funding for the institutions. Institutions that have issued bonds include Louisiana State University, University of Connecticut, Oregon State System of Higher Education, Jefferson County (Colorado) School District, and University of Michigan.

Student fees are a tool to raise CRDM capital or pay a bond debt service. By gradually increasing the student fee from $50/semester to $185/semester, University of Michigan currently raises $14 million annually toward a special deferred maintenance fund. Through positive public relations and by creating a $2.5 million scholarship fund from the student fees, University of Michigan has been able to dedicate $9.5 million annually to deferred maintenance. Similarly, Louisiana instituted a $50/semester building use fee for each student to shift the cost of maintaining higher education facilities from the general taxpaying public to the facility's user.

Other fund-generating options include self-funding energy renewal projects and reengineering. Each of the featured institutions has created a funding strategy that

maximizes their available resources and effectively works within the limitations of the funding environment. While all other state-funded institutions experienced budget cuts, the Oregon State System of Higher Education was able to develop a plan that increased their budget 500 percent since 1989. Similarly, despite cuts in state funding, University of Michigan—one of the largest campuses and most extensive facilities departments—has gained funding for a strategy that will allow them to completely eliminate CRDM backlog by 2002.

Present Strategy

Armed with a sound strategy, support from allies, and a clear vision of success, the next step is to present the strategy for approval to the decision makers. In many cases, the decision makers are the same individuals or institutions whose support helped create the strategic plan. The state legislators, university officials or local organizations who have been your allies throughout the strategies development will help open doors and build consensus among the decision makers. Sometimes the endorsement of just one dedicated individual decision-maker can determine the outcome of the entire proposal.

Similar to the presentation used to build support for the concept of CRDM renewal, the presentation requesting funding establishes the need for CRDM funding and then suggests a specific strategy to secure that funding. Already familiar to allies within the decision-making circle, the facilities manager demonstrates the strength of the strategy in the presentation. The facility manager's goal is to establish credibility through the presentation as a worthy steward of the facilities and a credible manager of the newly approved funding.

Manage Strategy's Implementation

Having established a strong strategy and earned support for it, the innovative facilities managers in this plan maintained their credibility by demonstrating their accountability. Accountability requires continual reaffirmation through frequent updates to the decision-makers on the progress of their strategy, and updated situation analysis. By establishing themselves as trustworthy and effective facilities managers, they were able to begin the process towards facilities equilibrium.

The First Step Toward CRDM Success

The reality of the deferred maintenance issue today is that most institutions have not yet addressed the challenge. Although most institutions have facilities that are depreciating and obsolescing, few have forged a proactive plan for facilities renewal. The institutions featured in this book have blazed a trail and set an example of innovative strategies to renew facilities and eliminate CRDM backlog. These institutions benefited from powerful leaders with a powerful vision. The vision became a strategy, and the strategy became a reality. Your institution has the same potential.

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About the Author

Matt Adams is a Registered Professional Engineer and a graduate of the Georgia Institute of Technology. He is a frequent speaker on the subject of facility management and strategic operational design. A full-time columnist for APPA's *Facilities Manager* magazine, Adams also publishes articles in a variety of other industry trade magazines. Adams sits on the Georgia Tech Engineering Advisory Board and is a member of Georgia Tech's Academy of Outstanding Engineers. Adams co-owned an engineering firm for ten years and now operates The Adams Consulting Group located in Atlanta, Georgia. He has worked with well over 100 colleges in his career.

The Association of Higher Education Facilities Officers
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